

Journal of the Royal Society of Arts

NO. 4996

FRIDAY, 1ST FEBRUARY, 1957

VOL. CV

FORTHCOMING MEETINGS

MONDAY, 4TH FEBRUARY, at 7.30 p.m. FILM EVENING. *Distant Neighbours; Harvest of the Forest; Shaped by Danish Hands; The Elephant will Never Forget.* (See last issue of the *Journal* for details.)

WEDNESDAY, 6TH FEBRUARY, at 2.30 p.m. CADMAN MEMORIAL LECTURE. '*Mining Education and Training*', by I. C. F. Statham, M.Eng., M.I.M.E., F.R.I.C.S., F.G.S., Emeritus Professor of Mining and Dean of Engineering, University of Sheffield. David Renton, T.D., Q.C., M.P., Parliamentary Secretary, Ministry of Power, will preside.

TUESDAY, 12TH FEBRUARY, at 4 p.m. Special General Meeting. (See notice overleaf.)

TUESDAY, 12TH FEBRUARY, at 5.15 p.m. COMMONWEALTH SECTION. '*Housing and Building in the Commonwealth*', by G. A. Atkinson, B.A.(Arch.), A.R.I.B.A., Colonial Liaison Officer, Building Research Station, D.S.I.R., and Housing Adviser to the Colonial Office. Sir Hilton Poynton, K.C.M.G., Joint Deputy Under-Secretary of State, Colonial Office, will preside. (Tea will be served from 4.30 p.m.)

WEDNESDAY, 13TH FEBRUARY, at 2.30 p.m. '*The Development and Use of Glass Fibres*', by A. Hudson Davies, O.B.E., M.A., Managing Director of Fibreglass, Ltd. W. J. Worboys, B.Sc., D.Phil., Chairman, Council of Industrial Design, and a Director of Imperial Chemical Industries, Ltd., will preside. (The Paper will be illustrated with lantern slides.)

MONDAY, 18TH FEBRUARY, at 6 p.m. The first of three CANTOR LECTURES on '*The Contribution of Lighting to Modern Life*', entitled '*Lighting in Outdoor Life and Work*', by J. M. Waldram, B.Sc., F.I.E.S., A.M.I.E.E.

WEDNESDAY, 20TH FEBRUARY, at 2.30 p.m. '*Modern Detergents*', by F. Courtney

Harwood, B.Sc., F.R.I.C., M.I.Chem.E., F.T.I., F.S.D.C., lately Director, British Launderers' Research Association. Sir Eric Rideal, M.B.E., M.A., Ph.D., D.Sc., F.R.S., will preside. (The paper will be illustrated with lantern slides.)

MONDAY, 25TH FEBRUARY, at 6 p.m. The second of three CANTOR LECTURES ON '*The Contribution of Lighting to Modern Life*', entitled '*Lighting in Commerce and Industry*', by C. Dykes Brown, A.M.I.E.E., F.I.E.S.

WEDNESDAY, 27TH FEBRUARY, at 2.30 p.m. '*Synthetic Detergents—a New Pollution Problem*', by B. A. Southgate, C.B.E., Ph.D., D.Sc., F.R.I.C., Director, Water Pollution Research, D.S.I.R. Sir Eric Rideal, M.B.E., M.A., Ph.D., D.Sc., F.R.S., will preside. (The paper will be illustrated with lantern slides.)

Fellows are entitled to attend any of the Society's meetings without tickets (except where otherwise stated), and may also bring two guests. When they cannot accompany their guests, Fellows may give them special passes, books of which can be obtained on application to the Secretary.

SPECIAL GENERAL MEETING

Notice is hereby given that a Special General Meeting, for the purpose of amending Bye-laws 50 and 51, will be held at the Society's House on Tuesday, 12th February, at 4 p.m.

By Order of the Council,

KENNETH WILLIAM LUCKHURST,
Secretary.

Proposed Amendments of Bye-laws

At the Annual General Meeting on 9th July, 1952, Bye-laws 48-59 were amended to provide for an increase in the subscription and life composition fee of Fellows elected after that date and for the payment by such Fellows of a registration fee. No increase was made at that time in the subscription of Fellows already elected, in spite of the fact that no change had been made in the rate of their subscription since 1920. The Council now feel that the time has arrived when the annual subscription, and the amount of the life composition fee, should be made the same for all Fellows, whatever the date of their election, and they will therefore propose that the text of Bye-laws 50 and 51 be amended to read as follows:

50. The Annual Subscription of every Member shall, subject to the right of compounding hereafter referred to, be Four Guineas, payable for each year of Membership at its commencement, such commencement to be reckoned from the quarter-day nearest to the day of election or admission. After the

ninth day of July, 1952, each Member shall on election pay a registration fee of Two Guineas.

51. Any Member may commute or compound for all future payments of his annual subscription, by payment of a sum of not less than Forty Guineas.

Proposed Extension of the Society's Premises

At the conclusion of the formal business it is expected that the Chairman of Council will make a statement regarding the proposed extension of the Society's premises.

**AWARD OF THE BENJAMIN FRANKLIN MEDAL
FOR 1957**

With the approval of H.R.H. the President, the first award of the Benjamin Franklin Medal has been made to Frederic C. Williams, O.B.E., D.Sc., M.I.E.E., F.R.S., Professor of Electrical Engineering in the University of Manchester, 'for his contributions to electrical engineering'.

It will be remembered that, as was announced in the *Journal* for 27th April, 1956, this new award is to be made annually 'to individuals who have attained early distinction, with promise of future achievement, in the promotion of arts, manufactures and commerce'.

Professor F. C. Williams, who is 45 years of age, was continuously employed throughout the War on the development of radar equipment, and he was responsible for fundamental inventions in probably every type of airborne radar equipment that has been used by the Royal Air Force throughout the war years and afterwards.

During his association with war-time radar developments, Professor Williams was himself primarily responsible for the fundamental concepts on which many vital radar systems and devices and automatic servo-mechanisms were based. In addition to this, however, his influence on all those working on radar development in what came to be known as the Telecommunications Research Establishment was far reaching and important. All his work was characterized by the soundest engineering design. If it is true that in this he followed the line originally introduced by the late A. B. Blumlein, it is also true that he extended and developed it over a very wide field. By the end of the war, Professor Williams had become generally recognized to be the leading exponent of electronic circuit technique in the United Kingdom and his work had become widely known and appreciated in the United States.



The artist's drawings of the medal, showing obverse: a portrait of Franklin and reverse: a winged genius bearing a torch, representing promise, flying upwards above a group of putti engaged in industry and the arts

Since 1946 he has held the Chair of Electrical Engineering in Manchester University, and during this post-war period his name has become associated with pioneering work on automatic electronic digital computers. In this field, amongst his more noteworthy contributions is an electrostatic information store, based on cathode ray tube techniques. The first commercial high-speed electronic digital computer to become available in the United Kingdom was fundamentally based on Professor Williams' cathode ray tube information store.

The designer of the new medal, which has not yet been struck, is Mr. Christopher Ironside, whose drawing for the obverse and reverse of the medal are reproduced above. Its association with the name of Benjamin Franklin is due to the fact that it was instituted in the year (1956) in which occurred not only the 250th anniversary of Franklin's birth, but also the 200th anniversary of his election to membership of the Society.

MEETING OF COUNCIL

A meeting of Council was held on Monday, 14th January, 1957. Present: The Earl of Radnor (in the Chair); Mrs. Mary Adams; Dr. W. Greenhouse Allt; Sir Alfred Bossom; Sir Edward Crowe; Mr. P. A. Le Neve Foster; Sir Ernest Goodale; Mr. John Gloag; Mr. Milner Gray; The Earl of Halsbury; Mr. A. C. Hartley; Lord Latham; Sir Harry Lindsay; Mr. F. A. Mercer; Mr. O. P. Milne; Lord Nathan; Sir Harold Saunders; Sir Selwyn Selwyn-Clarke; Professor Dudley Stamp; Sir Stephen Tallents; Mr. G. E. Tonge;

Sir Griffith Williams and Miss Anna Zinkeisen; with Mr. K. W. Luckhurst (Secretary); Mr. R. V. C. Cleveland-Stevens (Deputy Secretary) and Mr. David Lea (Assistant Secretary).

ELECTIONS

The following candidates were duly elected Fellows of the Society:

- Allen, John Nigel, B.A., A.L.A., New Milton, Hants.
 Bergel, Professor Franz, D.Sc., F.R.I.C., London.
 Bonner, Gordon William Victor, Maidstone, Kent.
 Colledge, John Neale, Orpington, Kent.
 Crabtree, Jack Wilson, B.Sc., Ifunda, Tanganyika, East Africa.
 Cripps, Lt.-Col. Charles Fruin, T.D., A.M.I.Mech.E., A.I.E.E., Watford, Herts.
 Davies, Elidir Leslie Wish, F.R.I.B.A., London.
 Day, Robert, M.B.E., Kenilworth, Cape, South Africa.
 Dipré, John, London.
 Edmonds, Walter Everard, M.A., LL.D., D.D., Edmonton, Alberta, Canada.
 Fowler, William Stewart, M.A., Redcar, Yorks.
 Fussey, Sidney Walter, Hessle, Yorks.
 Garnier, Cyril Charles, Des.R.C.A., Cardiff.
 Geary, Douglas, Brentwood, Essex.
 Greaves, Derrick Henry, Bramhall, Cheshire.
 Gray, Ian Mackenzie, D.A., Galashiels, Selkirkshire.
 Groves, Lealie James, Leicester.
 Hely-Hutchinson, Christopher Douglas, M.C., London.
 Hunt, Charles William, Chelmsford, Essex.
 Johnson, Leonard Charles, J.P., Watford, Herts.
 Krishnan, K. C., M.A., Delhi, India.
 Lanitis, George Nicou, London.
 Longley, Denis Major, Folkestone, Kent.
 McAlley, Marcus, D.M.R.(Ed.), L.R.C.P.(Ed.), L.R.F.P.S.(G.), Taunton, Somerset.
 Macpherson, Lt.-Col. Cluny, C.M.G., M.D., C.M., St. John's, Newfoundland.
 Marshall, Eric John, London.
 Millington-Ward, John, B.Sc., Athens, Greece.
 Mitchell, Leonard Victor William, Wellington, New Zealand.
 Oiderman, Hans Erik, Heckmondwike, Yorks.
 Packett, Charles Neville, F.C.I.B., A.C.I.I., Guiseley, Yorks.
 Pearce, George William, Orpington, Kent.
 Schembri, Carmelo Joseph Francis, Malta, G.C.
 Smith, Kenneth, Liversedge, Yorks.
 Spinks, Professor John William Tranter, M.B.E., B.Sc., Ph.D., F.R.S.C., Saskatoon, Saskatchewan, Canada.
 Stuchbery, Arthur Leslie, M.I.Mech.E., Enfield, Middx.
 Tucker, William Ernest, Colchester, Essex.
 Van Harlingen, Ernest Edward, Sacramento, California, U.S.A.

The following has been admitted as an Institution in Union under Bye-Law 66:

Société d'Encouragement pour l'Industrie Nationale, Paris, France.

BENJAMIN FRANKLIN MEDAL

The Benjamin Franklin Medal for 1957 was awarded to Professor F. C. Williams (see separate notice).

PROPOSED EXTENSION OF PREMISES

Further consideration was given to a proposed extension of the Society's premises (see notice regarding Special General Meeting).

BOARDS OF ARCHITECTURAL EDUCATION

Mr. O. P. Milne and Sir Alfred Bossom were reappointed as the Society's representatives on the Boards of Architectural Education of the Architects' Registration Council and the Royal Institute of British Architects respectively.

OTHER BUSINESS

A quantity of financial and other business was transacted.

SCIENCE IN KITCHEN PLANNING

Two papers by

MRS. MILDRED WHEATCROFT, M.A.,

*Chairman of the Research Committee, Council
of Scientific Management in the Home and*

MISS JOAN E. WALLEY, B.Sc.,

*Head of Household Science Department, Queen
Elizabeth College, London University, read to
the Society on Wednesday, 12th December,
1956, with John Gloag, Hon.A.R.I.B.A., a
Member of Council of the Society, in the Chair*

THE CHAIRMAN: 'Science in the Kitchen' is a subject which is of immense interest to all of us and indeed one which is basic as far as civilized life is concerned. We are very fortunate in having two speakers who are both specialists in this subject, both of whom represent bodies and educational institutions which are contributing a great deal to a matter which is too often overlooked when houses are planned and built. For a good many years it was treated, if not with actual contempt, with a certain amount of indifference by a very large number of people in England. The war has sharpened our appreciation of how food should be prepared; but we still do not regard as we should the importance of the kitchen as the machine core of the house. Now, please, do not think that I mean the ridiculous doctrine, which has gained so much publicity during the last thirty-odd years, namely that 'a house is a machine for living in'. The kitchen, however, is certainly the place that should have mechanical efficiency, because without mechanical efficiency you cannot hope for those artistic triumphs which contribute to comfort and well-being.

Our first speaker is Mrs. Mildred Wheatcroft, Chairman of the Research Committee of the Council of Scientific Management in the Home, a body that has been established for nearly thirty years, and is now part of the Women's Group on Public Welfare. It does a great deal of admirable educational work which influences the decisions of all kinds of bodies in the preparation of places where people can live and be happy, or try to be happy. Our second speaker is Miss Joan Walley, Head of the Household Science Department of Queen Elizabeth College, London University. That is the only department of its kind in this country, and indeed in Europe. We are so often told that people in other countries do things so much better than we do, that it is refreshing to be able to say that here is something that we do better than anybody else—and, in fact, that nobody else is doing.

The following papers, which were illustrated with lantern slides, were then read:

I THE PRINCIPLES OF PLANNING

BY MRS. MILDRED WHEATCROFT, M.A.

THE NATIONAL IMPORTANCE OF THE KITCHEN

There are about 15 million households in Great Britain who have their own cooking facilities. The time spent on cooking varies very greatly between different

types of households, so exact calculations are not possible, but it has been estimated that an average of four hours is spent daily in each household solely on the tasks of preparing and serving meals, clearing away, and washing up. Hence, quite apart from other work done in the kitchen and the work of the rest of the house, more time is spent in providing the nation's meals at home than is spent in paid employment by our total female working force.

It is often pointed out that our standard of living could be improved if the productivity of labour in our factories were increased. The same object could also be achieved by increasing the efficiency and productivity of our housewives. The contribution of the 'home industry' to our economy does not appear in estimates of our national income and is not easily calculated or sufficiently appreciated. Women form about a third of our total working population, and 48 per cent of these women are married. Many of them must be doing almost two full-time jobs every day. But, whether or not they are also engaged in paid employment, all housewives will be more efficient, and happier, if they have kitchens to work in which are scientifically planned. Time should not be wasted on unnecessary steps and much backache can be avoided by work surfaces fixed at the correct height for the individual worker. The health, happiness and contentment of the housewife are vital to a satisfactory home and both her physical and psychological needs should be considered when her kitchen is being planned, since it is the focal point of the family life.

SCIENTIFIC RESEARCH AND KITCHEN PLANNING

Some architects and builders may argue that there is not yet a recognized body of knowledge as to how a kitchen should be planned. Undoubtedly there is still need for further investigation into the tasks of the housewife and the equipment with which she should best perform them. But a great deal of research has been carried out recently, and the knowledge resulting from it is greatly in advance of present building practice. That the method of work study used in the factory could also be applied to the housewife's tasks, was realized in the decade before the last war and urged by the Council of Scientific Management in the Home, and at that time a number of kitchen planning studies were made. In those days experts inclined to examine the kitchen in its function as the workshop of the home and to apply to it the principle of flow of work borrowed from the factory. In one study, which was made for a film prepared by the Electrical Association for Women, the task of preparing breakfast in a badly planned kitchen was compared with the same task in the same kitchen after it had been replanned. Under the bad arrangement the housewife walked 199 feet and took 18 minutes to prepare breakfast, under the new arrangement she walked only 55 feet and took only 11 minutes. In the whole day's work a reduction was made of from 983 to 302 feet in distance walked and in weight carried from 741 to 93 lbs.¹ A saving of time of this order, of over one-third, if it applied to all meals for all the houses in the country, would save more time in the year than is spent by 3 million women working in industry.

I mention this study briefly to show that scientific kitchen planning is not

a new subject. Recently, however, a great deal more research has been carried out—both in the United Kingdom and other countries, notably the United States and Sweden. Time only permits a detailed description of the following two important investigations made in this country but the results of other research have also been considered when formulating our 'principles'.

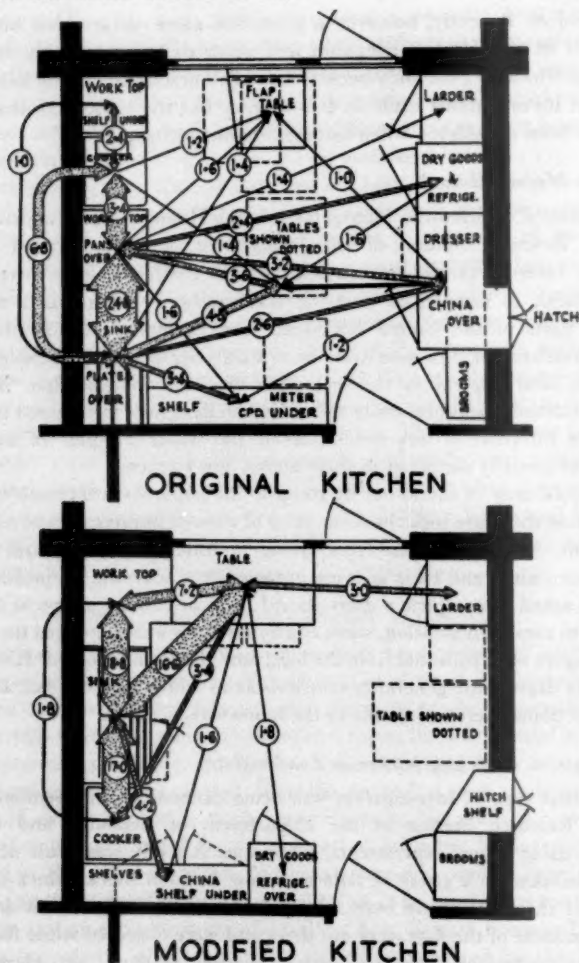
*'Meals in Modern Homes'*²

The Council of Scientific Management in the Home, with the assistance of the Building Research Station of the Department of Scientific and Industrial Research, recently carried out an inquiry into the facilities for preparing and serving meals in samples of post-war local authority houses in a number of different parts of the United Kingdom. The Committee which planned this inquiry consisted of representatives of women's organizations, domestic science specialists, and experts in the technique of social investigation. Before any recommendations could be made about kitchen designs it was agreed that a great deal more information was needed about the whole complex of tasks which housewives actually carry out in their homes and kitchens.

This could only be found out by going to the housewives themselves, and this investigation therefore took the form more of a social inquiry than of a laboratory experiment. Some 800 housewives, living in widely scattered rural and town areas, were visited and their answers obtained to a schedule of questions. They were also asked to complete a diary record form describing a typical day's work in regard to meals. In addition, some 260 house plans which covered the dwellings in the samples were collected from the local authorities and studied. It was, hence, possible to draw some general conclusions as to which type of plan, and certain features of plans, were acceptable to the housewife.

*Experiments on a working kitchen in London flats*³

A different type of investigation was being carried out independently in the Building Research Station of the Department of Scientific and Industrial Research, using a new experimental technique. A study was made of domestic work undertaken in a group of flats in a new London block. Mock-ups of the kitchens of these flats were built at the Station's Field Test Unit and housewives from some of the flats went out there and were observed while they carried out all the operations connected with preparing, cooking, and clearing away a mid-day meal for five persons. As a check the women were also observed performing the same tasks in their own homes. The method used in this case was to count the movements of food and utensils, rather than the subjects' own movements. Hence, the number of movements and the distance the various utensils were moved could be calculated. Although the kitchen had been thought well designed in the first place, after the experience gained from observation of the women actually working in it, it was found possible to reorganize the layout of equipment and make it more convenient. The housewives were then observed again, working under the new conditions which all except one said they preferred. The total distance travelled by all the articles moved during the test



[By courtesy of the Building Research Station,
Department of Scientific and Industrial Research

FIGURE 1. Percentage number of movements of food and utensils between equipment. (Movements totalling less than one per cent have been omitted.)

was reduced from 27,000 yards in the original layout to 22,000 yards—a saving of 18 per cent. There was also a reduction in the cost of equipping the kitchen. Figure 1 shows the reduction in the numbers of movements resulting from the rearrangement of equipment in this kitchen.

I should like to mention briefly one other piece of research, that on the 'Rehabilitation of the Disabled Housewife' undertaken by Dr. F. S. Cooksey⁴ who has worked under the auspices of the Department of Physical Medicine, Kings College Hospital. There, a kitchen unit intended particularly for the assessment and training of disabled housewives has been built in the Occupational Therapy Department. It is planned for a woman who has *paraplegia* and is confined to a wheel chair, and also for patients who have other forms of disability. The results of work done for disabled housewives may sometimes teach useful lessons in regard to stresses and strains for the normal housewife as well. It is interesting, for instance, to note that in this specialized kitchen the middle shelf of the oven, and hot plate of the gas cooker, the middle shelf of the refrigerator and the working surface of the whole unit are on the same level, so that lifting is reduced to a minimum. Another point mentioned is that, when visiting the patients' homes, it was found that one of the pieces of equipment most often required to help them when they returned home was a board between the cooker and sink so that pots and pans could be slid instead of having to be lifted.

WHAT ARE WE PLANNING FOR?

Before setting out the principles of kitchen planning which emerge from these various inquiries, we must first discuss the question: what are we planning for? What activities go on in the kitchen which we must consider?

(i) The whole cycle of operations connected with preparing food for the family: the storage of food, its preparation, cooking, serving and dish-washing.

(ii) In many dwellings the activities connected with laundry work: washing, drying and ironing clothes. There is an argument for taking all this out of the kitchen, but this is not the custom at present.

(iii) A number of minor activities performed by various members of the family, such as food preservation by freezing, bottling, and so on; shoe-cleaning, silver and brass cleaning, doing the flowers, washing the dog, and similar tasks.

(iv) A variety of family activities which take place in the kitchen, either because it is the best place in which to 'make a mess', or simply because mother is there and her advice and help are needed. For instance, toddlers may want to paint or model there and, at an older stage, the school homework may be done, so that mother can advise on spelling problems while she is cooking the supper.

(v) Eating meals: I have left this to the last, because it is a vexed and important question, and one on which the 'Meals in Modern Homes' inquiry threw considerable light. Although households vary very much in their practice in regard to where they take their meals, it was found that in the houses and flats where there is only one living room, other than the kitchen, the great majority use both rooms for meals. The kitchen is used more often for breakfast, taken usually in a hurry by different members of the family at different times, for snacks and where there are small children; the living-room in the evenings and for formal meals at week-ends and for visitors. Even where there is a separate meals room, the kitchen and living-room are also used sometimes for meals, although not so

much. Sometimes there were heating difficulties about the meals room and it was used less in winter than in summer. Practice varies with individual preferences, with the many varying types of households, and also of house plans. But there are a number of reasons for meals being taken actually in the kitchen. For instance, mother may want to feed small children in it since they are often very slow over their meals. Or she may want to provide a quick meal for the teenagers between work and their evening classes, listening to their accounts of their day's activities while she washes up the younger children's tea. If one is inclined to think of meals in the home as being three sit-down meals for the whole family at set times, a study of Appendix V to the 'Meals in Modern Homes' report—or Sir Thomas Bennett's account of his discussions with the housewives at Crawley⁵—give a very different picture. Here is just one example from the former from a housewife's own diary record. In this case the housewife prepared her first meal, breakfast for her husband, at 4 a.m. The next breakfast, for the children, was at 8 o'clock. Two lunches were served, one at 12 noon and the other at 3 p.m.; tea at 4.30 p.m. and an evening meal at 9 p.m. The day's work on meals started at 3.30 a.m. and ended at 10.15 p.m. And this was a simple type of family with only two age groups. Often there are older children as well, or adults working different shifts. The actual practice in many homes is something more in the nature of a running 'buffet'. Now, all this points clearly to the allowance at least of some space for a table where meals can be served in the kitchen.

Some modern kitchens are planned to allow different areas for each of the main activities. An example is a farm kitchen,⁶ designed by the United States Department of Agriculture (see Figure 2), which is planned in three separate working areas—one for odd jobs, laundry and food preservation, a central area for food preparation, dish-washing, cooking and serving, and a third area for meals, sewing, relaxation and play space for children. This is a new type of plan of considerable interest for a country kitchen.



[By courtesy of the United States Department of Agriculture]

FIGURE 2. *American farm kitchen. Places planned for major activities*

THE PRINCIPLES OF PLANNING

If the main principles of planning are grasped, it is often possible to have a convenient kitchen in rooms of very varying structural designs. The kitchen, as we have seen, is the centre of a number of different activities. Each of these has its own work centre around which the equipment necessary for carrying out the activity should be grouped. The most important work centre in the kitchen is the sink, because the greatest time is spent there. In another investigation,⁷ made by the Building Research Station, of the housewife's whole working day it was

estimated that 29 per cent of her working time was spent at the sink and the work top beside it, much more than in any other place. Next in importance to the sink is the cooker, and the main working surface.

Relationship between the cooker and the sink

Since many activities make use of both cooker and sink, it is the relationship between these two pieces of equipment which is of chief importance; they should be close together and there should be a good working-surface on either side of each of these pieces of equipment. Hence, the arrangement should go: work-surface, sink, work-surface, cooker, work-surface, or *vice versa*. This arrangement can be made in one line, an L or a U. Figure 3 shows this done in an L.

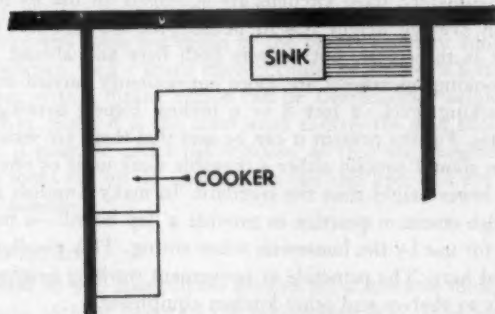


FIGURE 3. An L-shape arrangement. Sequence in arrangement of kitchen equipment

If this basic arrangement of the main equipment is right, all the rest can be grouped round it. The basic arrangement may sound almost too simple to state, but, alas, it is too often neglected even in the most up-to-date modern houses as Figure 4 shows. These are two actual kitchen plans taken from post-war local authority houses and they have many faults. Both have passageways right through the kitchen, cookers in corners; one has a sink in a corner, so that two draining boards are impossible. One has a very bad fault—the sink and the cooker are on opposite sides of the kitchen with a passage-way between.

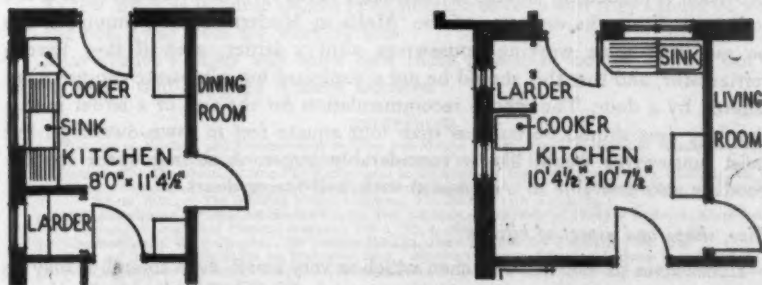


FIGURE 4. Examples of two kitchens showing many faults in design

The main work-surface

There should be a main work-surface in close proximity to both cooker and sink, and not smaller than 2 feet 6 inches by 1 foot 9 inches. These three pieces of equipment taken together form the work centre for the activity of cooking.

Heights of working surfaces

The importance of correct work-bench height, if the worker is to avoid back-ache and other forms of fatigue, has long been recognized in industry. It is equally important in the kitchen. Where possible the housewife should suit the height of her work-surface to her own measurements and to the particular job done. Unfortunately, most kitchens are equipped for use by many different workers and an average height has to be adopted for standard fitments. This at the moment is three feet, but experts both here and abroad consider that many of the cooking operations are more conveniently carried out at a somewhat lower working level—2 feet 8 or 9 inches. Expert investigation of this subject continues. For the present it can be said that there are strong indications that the kitchen should contain either a movable work table or one work surface at a somewhat lower height than the standard. In many Swedish and American kitchens it is also common practice to provide a 'lap board'—a pull-out flap at a lower height for use by the housewife when sitting. This excellent plan might well be followed here. The principle of convenient working heights should also, of course, apply to shelves and other kitchen equipment.

Storage

The general principle of storage is that all utensils should be kept as close as possible to the work centre where they will be used. This is simple to state in theory, but is a very highly technical problem to carry out in practice. I will not say more about it, because Miss Walley has made a particular study of storage problems.

Storage of food

This presents a somewhat vexed problem now that refrigerators are coming into fashion but not yet in general use, and even where they are in use some provision is needed for storage of perishable foods for which refrigeration is not indicated. From the evidence of the 'Meals in Modern Homes' inquiry it can be said that most working housewives want a larder, even if they have a refrigerator, and that this should be not a cupboard but a separate compartment entered by a door. The official recommendation for the size of a larder is that the floor area should be not less than four square feet in town dwellings, but most housewives would like it considerably larger. A storage space for dry goods is also desirable in a cupboard with well-fitting doors.

Size, shape and aspect of kitchen

Housewives do not like a kitchen which is very small, even though it may be a compact and well-planned work-place. If it is remembered that the housewife

spends about seventy per cent of her working time there this is very understandable. Some psychologists think that many housewives suffer from a slight form of claustrophobia due to being indoors and in the same room so much. Further, a very small room does not allow space for the other family activities we have described. It is difficult to be dogmatic about size, as it depends so much on the type of dwelling and household, but a kitchen of at least 100 square feet would seem to be required if some meals are to be taken in it, although in cases where there is a meals-room opening out of it, a smaller kitchen may be adequate. If the kitchen is to be the main place for meals, it should be at least 130 square feet, preferably larger.

A rectangular rather than a completely square shape of kitchen is probably the best, since this allows for the working area to be at one end, and the doors, circulation area and table for meals at the other. Eight or nine feet is a good width for a kitchen, and a small kitchen could be 12 feet x 8 feet or 9 feet x 11 feet. A kitchen with a dining alcove can be conveniently arranged in a space 9 feet x 16 feet. Since it is the main work centre, the sink should always be in a good light, if possible under the window, so that the housewife does not feel shut in. If it looks out on the garden, she can also keep her eye on the children as they play outside.

A table in the kitchen

There should be wall space in the kitchen for a movable table for meals or for children to use without being in the housewife's way. It is better not to have a table in the middle of the room.

Arrangements for the service of meals

Although some meals may be served in the kitchen others will not, so there must be ease of access between the cooking area and the meals area, whether this is in a meals room or living-room. This can be arranged either by a conveniently placed door or a hatch, and sufficient space in the kitchen must be allowed to dish up and serve the meal. A trolley is very much recommended for serving meals in rooms other than the kitchen.

Doors

As few doors as possible should open into the kitchen and they should be kept to the end, away from the working area.

Miss Walley's paper will show how these principles can be carried out in some really well-designed modern kitchens.

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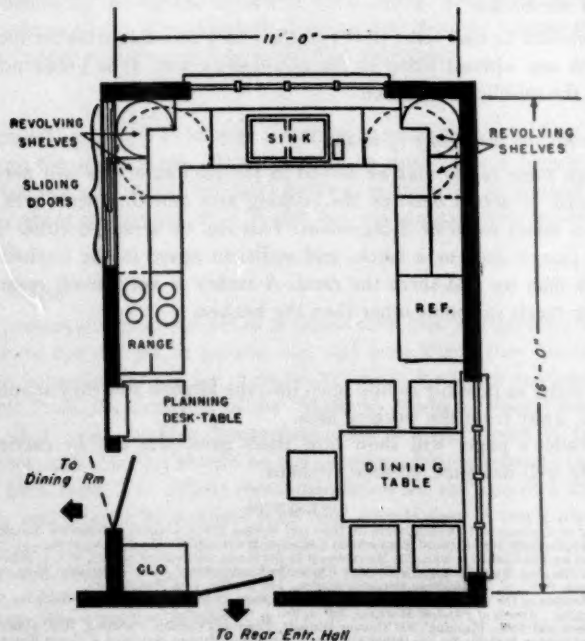
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II THE KITCHEN OF TO-DAY AND TO-MORROW

BY MISS JOAN E. WALLEY, B.Sc.

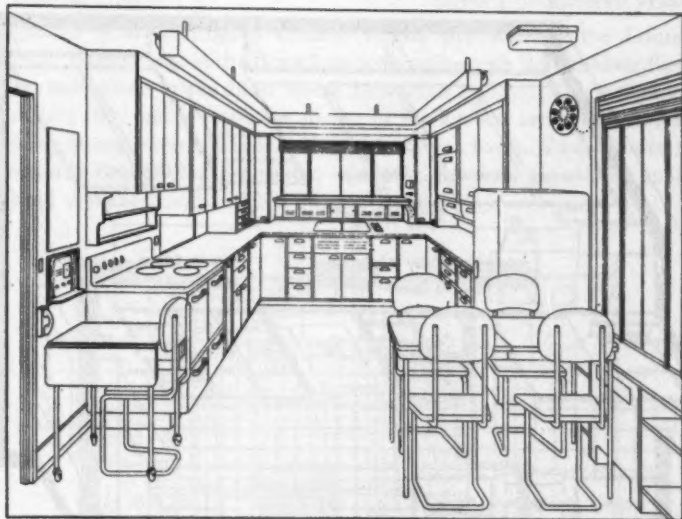
Mrs. Wheatcroft has outlined and explained the main principles of importance in kitchen layout, and these are so simple that it is surprising how rarely they are practised in our homes. It is not because a well-planned kitchen makes no appeal to-day to the majority of women—and men as well. The reasons why there are so few convenient kitchens are the ignorance of basic principles and expense involved in getting rid of a legacy of the past.

The kitchen of the home in which I grew up had five doors, and the cooker and the sink, and the working bench in the larder and the sink, were far apart. That kitchen was, of course, designed more than fifty years ago, yet one I saw in one of the new towns recently, although certainly an improvement on my mother's, still had noticeable deficiencies: the position of the cooker behind the door and the distance of the main working bench from it, the difficult access to the larder and the hanging of the door to the dining-room which, when open, swings on to the kitchen boiler. The inquiry described in 'Meals in Modern Homes' mentioned by Mrs. Wheatcroft also showed that many kitchens built



[By courtesy of the United States Department of Agriculture]

FIGURE 5. *Step-Saving U Kitchen*



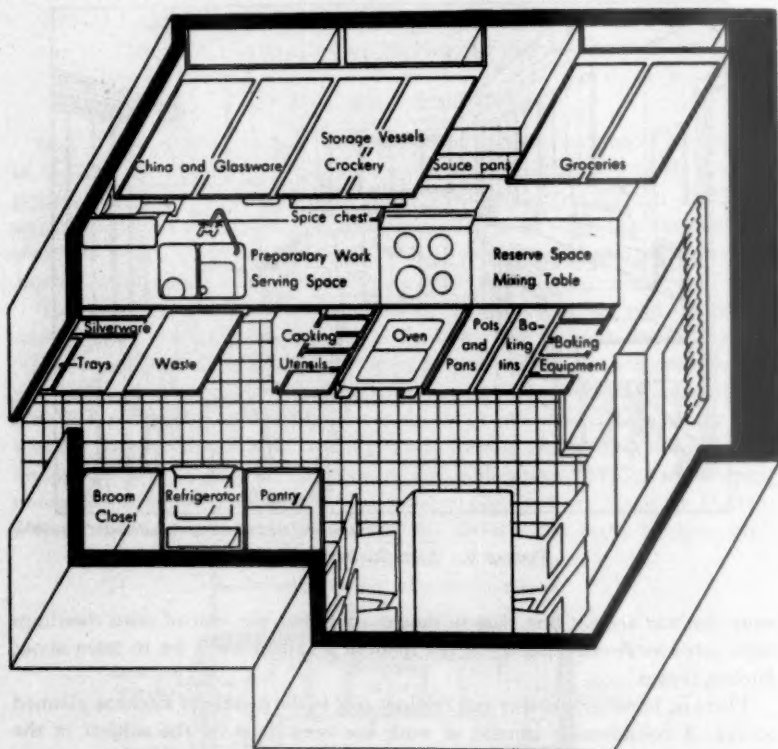
[By courtesy of the United States Department of Agriculture

FIGURE 6. *Step-Saving U Kitchen*

since the war are not first class in design—only five per cent of town dwellings were rated as A standard. Even the modern architect has a lot to learn about kitchen layout.

There is, however, another and brighter side to the picture of kitchens planned to-day. A considerable amount of work has been done on the subject in the United States and in Sweden, as well as in our own country, as the accompanying illustrations show. Kitchen layouts from overseas are not necessarily suitable for this country because meal patterns and cooking methods differ, but none the less much can be learned from a study of them.

Figures 5 and 6 show a plan and a perspective plan known as the 'Step-Saving U Kitchen,' produced by a research department of the United States Department of Agriculture. I had known of this kitchen for some time, and was very interested to see a working model of it when I visited Beltsville near Washington two years ago. It has an overall area of 176 square feet, which includes dining space for five persons and it also provides alternatively for more formal dining in an adjoining room. The kitchen layout is in accordance with all the principles already mentioned—entrance and exit doors away from the working area, the main working centres arranged in the right relationship to each other and with the sink between the cooker and the mixing centre. An interesting feature of this layout is the very convenient position of the hatch, both for service and for dishes when returned for washing up. This hatch, as you will notice, has drawers and cupboards for the storage of dishes, cutlery, linen, and so on for dining, which can be opened from both the kitchen and the



[By courtesy of The Swedish Institute]

FIGURE 7. *Perspective plan from Swedish Housing*

dining room. Other points of interest are the revolving shelves in the two corners, the storage containers behind the sink for detergents and vegetables, and the arrangement for garbage disposal. The hole with removable cover in the right-hand draining board connects directly with the garbage pail beneath and this can be removed through an insulated door in the outside wall.

Figure 7 shows a model Swedish kitchen produced by the Housing Committee of the National Association of Swedish Architects,¹⁰ and proposed as a standard by the Building Standardization Committee of Sweden. It is not as lavish as the Step-Saving U Kitchen but has a very good working arrangement. We should perhaps consider it to be more suitable for a flat than for a house where we are accustomed to having two doors, one of which leads directly to the outside. You will notice that each cupboard is designed for the specific goods it will hold—a factor as important in contributing to convenient working conditions as the arrangement of work centres.

Figure 8 is of an English kitchen. It was produced by the Council of Scientific Management in the Home¹¹ in conjunction with the Building Research Station and shown at the Ideal Home Exhibition in 1955. The overall area is 124 square feet, and it caters for dining in the kitchen or alternatively in the adjoining dining-room to which it is connected by a hatch. Two features which are typically English should be noted—the provision for a wash boiler under the left-hand draining board and of a walk-in larder.

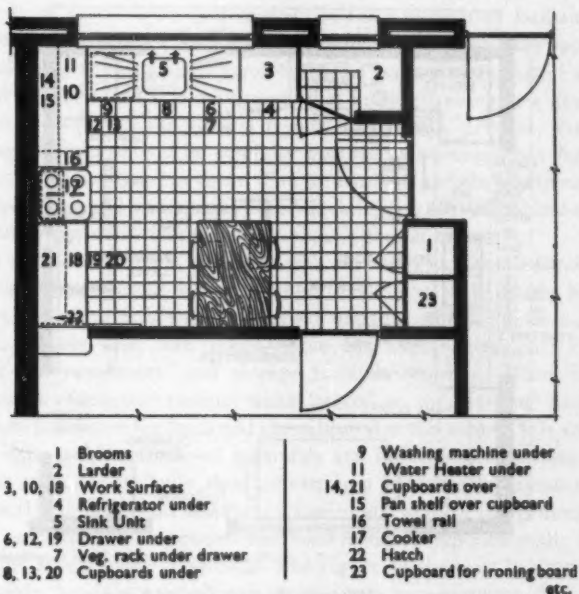
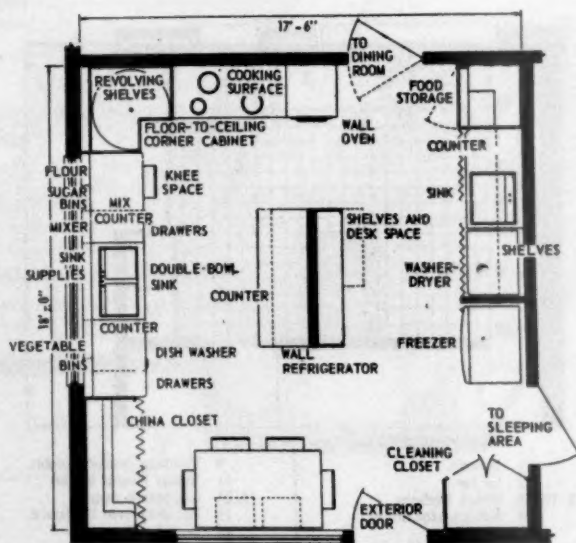


FIGURE 8. *The C.O.S.M.I.T.H. kitchen*

The three plans we have seen are designed for the average housewife who is reasonably active but at the same time wishes to save time and energy in carrying out domestic tasks in the kitchen. The next plan (Figure 9), again from the United States Department of Agriculture and called *The Beltsville Energy-Saving Kitchen*,¹² is quite suitable for the strong and healthy housewife but would be particularly acceptable to the physically handicapped, such as women with heart trouble, since most of the work can be done in a sitting position and equipment reached without bending or stretching. Storage units, refrigerators and oven are so planned that access to them during everyday food preparation is confined to the space between 27 inches and 63 inches from the floor, which is considered to be the most economical in energy for the woman of average height. The overall area of 315 square feet is very generous, but economy in

area was not an essential feature of this layout, which in any case includes facilities for laundry work, and for food preservation, as well as for dining. Features of particular interest in this plan are the wall oven fixed at waist height and the adjoining cooking surface. The revolving corner cabinet reaching from the floor to the ceiling is another interesting feature. It is designed to hold the equipment needed by the housewife when she is sitting at the mix counter.



[By courtesy of the United States Department of Agriculture]

FIGURE 9. *Beltville Energy-Saving Kitchen*

The planning of the layout for a model kitchen or for one in a new house is of great interest and importance. Adaptations of existing layouts are, however, of perhaps even greater importance, because we have many more old houses than new and the majority of housewives will only get better working conditions by improving layout and storage facilities in the houses they have at present. Mr. Madge of the Building Research Station has recently published a useful paper on 'Modernization of Kitchens',¹⁸ in which he shows how the layout of kitchen equipment in an existing house can be improved at a reasonable cost. The paper is illustrated by three different plans of the ground floor of three-bedroomed, parlour-type, semi-detached houses with the kitchen layout before and after improvement. He makes a point of the fact that it is not necessary to carry out the alteration in a single operation provided a definite plan of the final intention is first drawn up.

The Home Economics Department of Cornell University has also made an important contribution in this field. For a number of years since the war, research work on efficient kitchen storage has been going on at this college, in which the value of single row storage has been pointed out and units incorporating this principle designed. Briefly, the units are planned so that the total cubic capacity is fully occupied by goods, unlike many of the cupboards we know where shelves may be anything from 12 inches to 24 inches in depth and fixed at distances of from 12 inches to 24 inches above one another. Such shelving always involves a great waste of space. This work is described in a number of bulletins.¹⁴ The importance of the storage aspect of kitchen planning is often not fully appreciated. Understanding of the principles involved in the horizontal layout of a kitchen is now fairly general, but it is only rarely that in the planning of a new kitchen attention is focussed on the vertical layout. Cupboards, drawers, shelves and other storage devices should be carefully planned to accommodate the utensils and equipment to be stored in them. The principle of keeping equipment at the place of first usage and under conditions where it is readily visible and accessible should receive very much more attention than it does at present.

In their more recent work, described in a booklet *The Cornell Kitchen*,¹⁵ the research workers at Cornell have attempted to combine their former work with the concept of work centres, and have devised units for each of the work centres—five in all, namely sink, mix, range, serve and oven-refrigerator. Each unit consists of the equipment and storage facilities required. Thus the range centre consists of electric cooking units located in the working bench, with shelves above and below for foods and utensils used at this centre. It is anticipated that these units will be purchased separately and introduced either one or more at a time as money is available, thus converting a poor kitchen layout to a first-class one with the minimum of effort. These units were in the prototype stage about two years ago, and a number had been installed experimentally in homes for use under actual living conditions. The report on the tests has not yet been made available, but it is awaited with interest as a very real contribution to the problem of how to improve existing kitchens.

Yet another contribution in this field comes to us from the United States. The Small Homes Council¹⁶ of the University of Illinois have produced a book for the guidance of architects, contractors, builders, home economists and others who design kitchens using factory-built cabinets. The most useful feature of this publication is the collection of drawings showing the various layouts possible in thirty different basic kitchen plans, each of which gives the distances covered by the housewife in her travels between essential work centres.

Finally, I would like to illustrate an adaptation carried out recently in a house built about twenty years ago. The main defect of the kitchen was one of overall area: it was only 66 square feet. It was, therefore, decided to extend it to give a final area of 108 square feet, and only one direction was possible. Another defect was the position of the cooker which was alongside the door into the hall. In this position cooking smells were inevitably carried by the prevailing draught from the back door into other parts of the house and

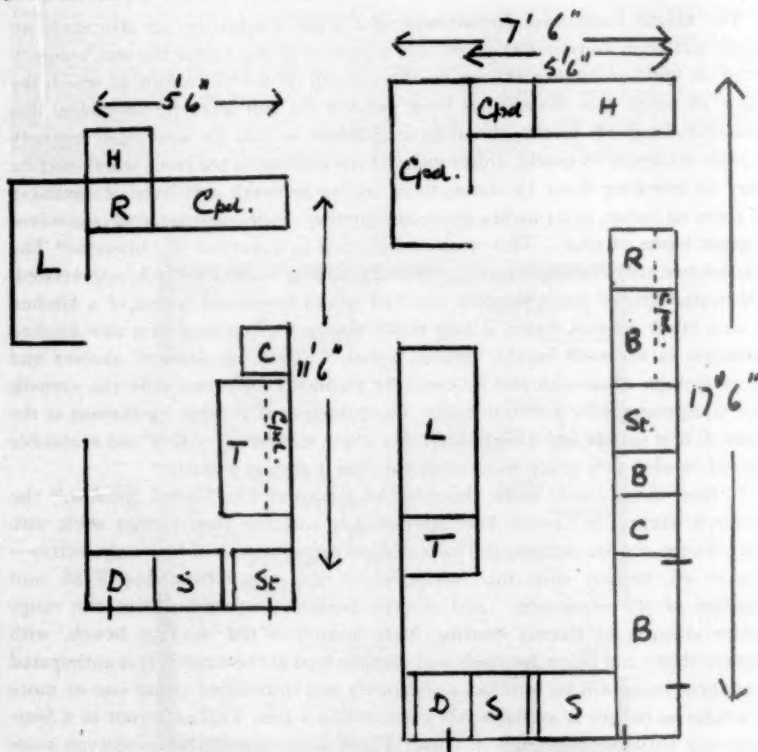


FIGURE 10. *Kitchen adaptation: Left: before; Right: after*
 Key: B = bench; C = cooker; Cpd. = cupboard; D = draining board; H = hatch; L = larder; R = refrigerator; S = sink; St. = water heater; T = table

particularly up the stairs and into the bedrooms. Yet another defect was the small amount of window space and this gave no outlook at all on to the pleasant garden of this country house. Figure 10 shows a plan of the kitchen before and after replanning. The new layout is in an L formation with a good cooker-sink relationship. It is usually found that a servery on the long side of a rectangular kitchen is more convenient than on the short side, but in this case it was not possible, of course, to change the position of the dining-room, which remains on the side of the kitchen farthest from the sink.

Features of this kitchen which are typically English are the presence of the kitchen boiler and of the larder, in this case not a walk-in cupboard but a ventilated wall cupboard with a roller-shutter door. The arrangement for garbage disposal, similar to that in the American kitchen, is also interesting.

Considerable thought was given to designing shelves and cupboards to make them suitable for the particular items of equipment to be kept in them and locating them conveniently. Thus the cupboard to the left of the cooker holds the dinner service; the shelves above the cooker, salt, pepper, tea, coffee, and tea and coffee pots. Saucepans are stored on slatted shelves near the cooker and sink; dry ingredients in a cupboard with four-inch shelves above the working surface between cooker and refrigerator; and tins, scales, bowls and so on in the cupboard beneath. The large hatch designed to hold foods, china, cutlery and linen used in the service of meals is a striking feature of this kitchen. The bottom shelf is not used for permanent storage except for a few items at each side and is thus always available for through service. The distance between this and the next shelf is such that a tall packet of breakfast cereal can be fitted in. No one would claim perfection for this kitchen, for an adaptation must of necessity be a compromise. The perfect design is not always possible even in a new house but at least this example shows how the principles of kitchen planning can be put into practice in adaptation. I can assure you that this new kitchen is now a very pleasant and extremely convenient place in which to prepare meals.

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DISCUSSION

MR. E. M. RICH, C.B.E.: In Mrs. Wheatcroft's first slide, she showed that, by altering the kitchen, a saving of movement of about 18 per cent was effected. Could she tell us what were the main alterations which were made which resulted in the saving of movement?

MRS. MILDRED WHEATCROFT: In the original kitchen the cooker and sink were at one end and the refrigerator and dry goods cupboard at the other. In the replanned kitchen the dry goods cupboard and refrigerator have been moved, which saves a considerable amount of walking from one side of the room to the other and is very much more handy for the cooker. The china cupboard has also been moved and in the new arrangement is kept very much closer to the sink. Another good feature of the new kitchen is the very good preparation table. Instead of having a table in the middle, provision was made for a good working surface against the wall and under the window, at a lower height than the other fixed equipment; this is intended for mincing, pastry-making, and so on. The cooker was also moved, so that the sink is nearer the window, has plenty of space round it, and is in the centre of the working area.

MR. GEORGE FEJÉR: The point that is troubling me most is the very important aspect of verticle planning. In this country we do not seem to be getting down to any development of waist-high ovens. Quite a lot of cooker advertisements still show a housewife having to stoop down to the oven, with the blast of hot air rising in her face.

I also noticed in the excellent model kitchen which was planned by Miss Walley, that the question of stooping was not focussed. On the double sink, the one with the disposal strainer, the cupboard handles which should have been placed at the top of the door have been fixed in the middle, so the housewife has to stoop to reach them.

I also noticed that the shelf heights were carefully dimensioned to suit existing crockery. Is it not far better to have easily adjustable shelves so that if you do buy a coffee percolator that is on the large side, you can adjust the shelf to the most convenient position?

MISS JOAN WALLEY: There are some ovens of waist height now in this country. Yes, clearly shelves should be adjustable. It is a question of designing a simple one that is not too expensive.

MR. J. L. GRIFFIN: Our kitchen is normally fairly tidy, but I have never seen such a mess as there is after a big meal has been prepared. We have a hatch, not a double-sided one, but I do not think it makes a lot of difference. We pass the things through the cupboard, then on to a shelf by the window as in the arrangement shown. Then the crockery has to be transferred to the draining board; sometimes there is even more than a draining board full after a supper.

I would like to know if there is any real attack on cutting down the occupation of clearing up after meals so that the kitchen is kept tidy instead of being in a shambles?

MISS WALLEY: It is rather difficult to answer this question without saying how people work in kitchens and how they plan meals. People do work in different ways, some are frightfully methodical and cannot bear a kitchen to be untidy for a minute, other people are the opposite. I suppose really the answer is to have a dish-washer. Having seen that in America it does seem to me the one thing. Put all the dirty things in the dish-washer, go out for 45 minutes, and when you come back everything is finished.

MR. GRIFFIN: Dish-washers are very expensive and do not appear in many kitchens, they are rarer than refrigerators. It entails still more time and motion study to handle the dish-washing in comparison with quick washing up. It has been proved that, in a small establishment, it does not save anything, considering the economics of the installation of a dish-washer, costing perhaps £130. If we are to go in for the perfect American kitchen which costs about £3,000, it eventually involves having somebody to clean all the machines that do the work. What we want is not a dish-washer, but somewhere to tidy away the dishes preparatory to washing up.

MRS. WHEATCROFT: In our own kitchen we do not have a dish-washer, but have a double sink, which is very handy to put all the dirty things in on one side and forget about them until it is time to wash up.

MISS B. L. MARTIN: When the working surfaces go from a mixing surface to the stove, then another surface and then the sink, the person who has to do all the cleaning herself finds it very tricky unless the whole thing is in one unit. Crumbs and other things always go down between the two units and there is no way of getting them out. It is fine to have the cooker up against the wall in a modern place, but when we had to move our own we were disgusted—we thought we had always kept the place tidy but the back of the cooker was appalling. Another thing equally important is the garbage tin by the sink, which has to be cleaned out at least every other day. Is there anything that can be done to improve matters?

MRS. WHEATCROFT: This is a very difficult problem. Of course, in many of these new kitchens the units are designed in one piece which overcomes the problem; but in the kitchen which has to be adapted it is more difficult. Sometimes you can

have the units made so that they can be pulled out and you can clean behind them. Some cookers can be fixed like this, but it is, of course, more expensive.

MR. T. G. R. WILLIAMS: In America the trend is to manufacture metal kitchen cabinets, and for some time now manufacturers in this country have concentrated on metal kitchen cabinets also. Do our two speakers think that there is a definite preference for wooden cabinets, or do they prefer metal units?

MISS WALLEY: I definitely prefer wood, it is a much more friendly substance. If you want to screw things into it you can, whereas with metal you have got to be much more of an engineer if you want to attach anything to it.

On the other hand, I think metal has one advantage in that you are happier putting up a metal unit, rather than a wooden one, against a cooker.

MR. L. J. ROBERTS: I am not quite sure how the 'average height' referred to has been arrived at. If you do not happen to be an 'average' woman, then you are forced to wash up at a sink that is an inconvenient height, which leads to back-ache. Ought not greater importance be attached to the possibility of having sink heights that can be varied? It does not seem a difficult thing to me. It could be possible to put the sink on a rack on a wall, or a stand with flexible tubes. Can either of the speakers tell me whether, in this country or anywhere else, it has been attempted?

MISS WALLEY: In the work I spoke of, the Cornell kitchen, units are adaptable for height. They have lifts that can be put on. I am not sure whether that applies to the sinks or not because of course it is difficult, but on all the other units the height can be varied.

MR. MARTIN A. BUCKMASTER: Can the lecturers tell us of what the ideal sink is made: is it china, metal or wood?

MISS WALLEY: There are points for and against glazed metal and wood, porcelain enamel and one of the new materials, laminated glass fibre. The metal sinks are certainly attractive and are hard wearing. One of the great disadvantages people usually point out with regard to them is they must be thoroughly dried when you have finished your work if they are to look nice. If you leave them even slightly damp they do not polish well, and from then onwards you never want to use them again because you will spoil the effect.

MR. H. D. MANNING: I wonder if either of the speakers could give us any lead on lighting or ventilation?

MRS. WHEATCROFT: Of course, they are both extremely important, but we have had to confine our papers to the layout of the kitchen. Lighting is essential, particularly over the sink area, but there should be good light at every working area and there is no possible reason why there should not be, with the modern developments in electric lighting.

With regard to ventilation, I am afraid I am not a ventilating engineer. I do not know if there was any particular point you had in mind, such as having an electric fan over the cooker, which is very useful in some cases. Apart from that there should be no great difficulty if the kitchen has good windows, and is designed according to the principles we have laid down, instead of being a passageway into the house as is so often the case.

MR. MANNING: One does sometimes see enormous hoods with extracting fans over the cookers, but they always look filthy. With regard to windows and doors the drafts blow where they like, usually in the wrong direction. Is there any answer?

Can there be controlled ventilation in the kitchen, where it seems to me very important that the smells should go out of the house, instead of into it?

MISS WALLEY: You perhaps will remember that I did mention the position of the cooker in the adaptation. It was important to have it so that the draft did not take the smells into the house. I feel that the problem of ventilation is a little greater in a kitchen where you have gas cooking than where there is electric cooking, because of the products of combustion. Hoods may be suitable. I think it does just depend a great deal on the kitchen itself. Temperature, of course, is another feature. If you have a cold kitchen you will get condensation. It is quite a big problem.

MRS. G. M. GLOAG: Could Miss Walley tell me whether the roller shutter is in regular supply in this country, and if it is easy and convenient to handle?

MISS WALLEY: They are available if you know where to go. They do work very easily and do not take up a lot of space at the top, but there is the roller at the top that must be accommodated. The thing that struck me is that they are rather noisy in operation. They are made of wood.

MRS. C. W. DEW: What is Mrs. Wheatcroft's opinion of the use of a trolley to save footsteps in the kitchen, particularly if it is a long one; for example, for taking things from the hatch to the sink and back?

MRS. WHEATCROFT: My own opinion is that it is quite invaluable in a large kitchen; I use one all the time.

THE CHAIRMAN: It is now my pleasant task to propose a vote of thanks to our lecturers. We have had two very interesting papers. They have touched on vital problems; an enormous number of people, both men and women, spend a lot of their time in the kitchen.

If kitchens were properly planned, it would not only ease the work, as we have seen from the various slides, but they would be extraordinarily pleasant places to live in. I have the happiest recollection of spending some time with some friends of mine in a house in Ohio, when I was in America earlier this year, where the kitchen was planned identically with one of the plans shown by Mrs. Wheatcroft. It was one of the pleasantest places to live in, as a *living* room, that I have come across in years.

Some interesting points have arisen out of the questions. We have all thoroughly enjoyed these two papers, which have brought out many points, some of them obvious, and some of them not obvious at all. When you start thinking about kitchens, and about the way the work should be planned in this essential basic workshop in every home, you realize that it is a good thing that everybody, or nearly everybody, particularly those who are concerned with planning kitchens, should occasionally re-assess their ideas. I think that these two papers will do a great deal of good in making people take their own ideas to pieces and put them back again in a better shape.

A vote of thanks to the Lecturers was carried with acclamation, and the meeting then ended.

HOME SAFETY

A paper by

MAJOR-GENERAL B. K. YOUNG, C.B.E., M.C.,

*Director-General, The Royal Society for the Prevention
of Accidents, read to the Society on Wednesday,
5th December, 1956, with Sir Austin Strutt, K.C.V.O.,
C.B., Assistant Under-Secretary of State, Home Office,
in the Chair*

THE CHAIRMAN: I regard it as a very great privilege to have been invited by the Royal Society of Arts to take the chair at this meeting at which we are to hear a paper on 'Home Safety'. As you will have gathered, I am a civil servant and I work at the Home Office. My association with Home Safety goes back to my very early days in the Home Office. I joined it in October, 1925; before I had been there four months I was concerned with dealing with a firm which had imported an electric train which the electrical advisers to the Home Secretary regarded as a very dangerous instrument. We conducted correspondence with the firm very unsuccessfully for a period of about seven months, and thirty years ago, in December, 1926, the Home Office took the then unprecedented step of issuing, just before the sale of toys and presents at Christmas was due to start, a notice warning everybody that that particular form of electric toy train was dangerous at home. The firm took no notice of our letters, but the publicity we got for that very unusual step led to the disappearance of that particular electric toy train from the market.

So far as the Government as a whole is concerned, our activities in this field have only extended for about the past ten years. The Ministry of Labour were very concerned about the effects on production of the large numbers of absences of people, male and female, because of accidents in the home and they suggested that the Home Secretary should do something about it. One of the things which was done was the setting up of a standing inter-departmental committee to coordinate the activities of all the bodies, official and unofficial, with interests and responsibilities in this field. It was my privilege to be the first Chairman of that committee on which all the responsible government departments are represented and which works in very close liaison with the Royal Society for the Prevention of Accidents. In this country it so often happens that governmental action follows long after the action of voluntary bodies. The Royal Society for the Prevention of Accidents has been pegging away at the problem of accidents in the home for more than a quarter of a century. It is, therefore, particularly appropriate that the Director-General of that Society, General Young, should have been invited to give this paper. He probably knows more about this subject than anybody else in the country and I have very great pleasure in introducing him to you. I now call upon him to read his paper.

The following paper was then read:

THE PAPER

INTRODUCTION

On several previous occasions, oddly enough at two-yearly intervals, the Royal Society of Arts has listened to papers on various aspects of the accident

prevention problem. In 1950 the three Cantor Lectures, given by Dr. W. H. Glanville, dealt with 'Road Safety and Road Research'. In 1952 the Shaw Lecture on 'Industrial Accidents' was given by Mr. H. R. Payne, and in May, 1954, the three Cantor Lectures were given on 'Safety on the Road', by Dr. W. H. Glanville; 'Safety in the Air', by Air Commodore Sir Vernon Brown; and 'Safety on the Railways', by Lieut.-Col. G. R. S. Wilson. To-day, in 1956, your Society is kind enough to welcome another paper on, perhaps the most difficult of all forms of accident prevention—the prevention of accidents in the home. I wonder if in 1958 you will ask us to present a paper on our latest accident prevention baby, Agricultural Safety?

For the past 25 years, the Royal Society for the Prevention of Accidents (Ro.S.P.A.) has been the pioneer in Home Safety work; in the early days it was a tough and uphill task to break down public apathy and to spread knowledge of the extent and consequence of home accidents, but increasing publicity and the interest taken by many local authorities, together with a large number of voluntary organizations, has brought about an increasing awareness of the problem; Home Safety is, at last, becoming a matter of widespread concern; the national conscience is being stirred.

The home accident problem in relation to all accidents

The annual death rate from all accident causes amounts to nearly 18,000 fatalities, very many more suffer severe and, in many cases, permanent, injury or disfigurement, and a totally unknown number of millions suffer minor injury. To this suffering must be added the economic cost and wastage that all these accidents cause to the nation. The accident prevention problem is formidable. Table I gives the primary breakdown and indicates the main fields in which accident prevention is required:

TABLE I. IN GREAT BRITAIN, ON AN AVERAGE, EVERY DAY
45 PEOPLE DIE AS A RESULT OF ACCIDENTS*

14 on the roads ...	}	<i>i.e.</i> 16 in some form of travel
1 on the railways ...		
1 in air and water transport		
2 in factories ...	}	<i>i.e.</i> 5 in places of work
1 in coal mines ...		
2 in farms, quarries, etc		
17 inside the home ...	}	<i>i.e.</i> 24 in and around the home
7 in everyday pursuits		

* All fatality figures quoted in this paper refer to England, Scotland and Wales, and are taken from the Annual figures published by the Registrars-General for England and Wales, and Scotland, respectively.

Unexpectedly perhaps, in the three vocations or employments normally looked upon as hazardous there occurs the lowest daily average of accident fatalities, namely, one each on the railways, in air and water transport, and in coal mines—yet look at the headlines in the Press when such accidents occur. Can you recollect any such national publicity about home accidents, of which the daily average is as high as 17?

Consider the two a day in factories. Professor Chester, of the University of Manchester, pointed out that during the first six months of 1955 strikes in this country *had cost* 2,795,000 working days, or more than the whole loss for any year since 1945. With no newspapers and no trains, the impact of the stoppages was brought into every home. It was not surprising, therefore, that the people experienced a considerable shock and that demands were voiced for immediate and drastic action by the Government. Let us put against that figure another given by Sir Walter Monckton, when Minister of Labour, to the effect that nearly 20 million working days are lost every year in industry through injuries and occupational diseases. This loss is some seven times that referred to as due to strikes, yet it is the latter—the lower figure—which makes headline news, not the 20 millions due to accidents. This illustrates so well the difficulties of the safety worker. Much is being done and a great deal has already been accomplished in the way of accident prevention in these particular fields. Much money is being spent on this worth-while work, and a vast amount of time, thought, research and effort is being expended. Results are being achieved.

Let us be frank and face facts. Very little, in comparison with other fields of accident prevention, is being done about, or spent on, home accident prevention. The purpose of this paper is to pose two questions:

Why is so little being done about Home Safety?

How can more be initiated, and the intensity increased?

Remember, 17 a day die by reason of an accident in their home—*surely* that should shock the people?

At present, except for fatalities, no system exists for the accurate recording of home accidents, but a conservative estimate, based on sample hospital returns, shows that probably every year:

60,000 to 70,000 home-accident cases receive in-patient hospital treatment, and over 1,000,000 receive out-patient hospital treatment, while many other minor injuries are treated by district nurses, health visitors and first-aid workers.

A further estimate shows that the treatment of these home-accident cases involves at least $1\frac{1}{2}$ million hospital days each year, a fact indicative of the severe strain placed on hospitals and nursing services by home accident casualties.

HOME ACCIDENTS

The victims

Home accidents can, and do, happen to people of all ages, but examination of the figures shows that two age-groups are particularly vulnerable; the children under five years of age and the elderly age-group—those of 65 and upwards.

TABLE II. FATAL ACCIDENTS, 1954

Children under 5 years	...	...	890	...	11%
Children 5-14 years	...	...	120	...	2%
Adults 15-44 years	...	...	450	...	6%
Adults 45-64 years	...	...	851	...	11%
Adults 65 and upwards	...	...	5,412	...	70%
Total number of deaths			7,723	...	100%
Male deaths	...	...	2,924		
Female deaths	...	...	4,799		

These figures show quite clearly the relationship of age incidence to place incidence; those who spend most of their time in the home being more liable to home accidents than those whose time is spent between home, work or school, and daily travel between these two points; and women, who naturally spend more time in the home than men. While all fatal and serious accidents present a problem of national health and well-being, two particular problems are suggested by these figures:

That of the pre-school child who suffers serious and often permanent injury through home accidents, and who creates special problems of education and employment later on, and

The equally serious problem of providing hospital or institutional care for the elderly who are permanently incapacitated through accidents, and who are no longer able to care for themselves, or to be looked after in their own homes.

Types of home accident

Year by year home accidents fall into four main categories: falls, burns and scalds, poisoning, and suffocation. Table III shows the way in which these accidents are related to the various age groups.

TABLE III. ACCIDENT INCIDENCE (FATALITIES) 1954

Type	Percentage	Chief victims
Falls	61%	65s and upwards
Poisoning	14%	45s and upwards
Burns and scalds ...	11%	65s and upwards and under 5s
Suffocation	10%	Under 5s
Miscellaneous	4%	65s and upwards
TOTAL	100%	

Home accident causes

Information given at inquests and investigations into home accidents generally, suggest that in broad terms some of the causes may lie in the changing pattern of social life.

First is the large and increasing number of married women, over 3,370,000, who are employed outside their homes; this may lead to over-fatigue and does lead to less supervision of the home, particularly during school holidays.

Secondly, the increasing longevity of the population, which brings an increasing number of people into the most vulnerable group.

Thirdly, the increased mechanization of the home through many new labour-saving gadgets and devices, which may also bring increased risk of accidents through misuse or lack of understanding, coupled with the many new synthetic fabrics now being made, some of which are of a highly flammable nature.

Fourthly, the high cost of living, which may cause delay in attending to faulty appliances, and which may also create conditions of overcrowding in homes in the lower income groups—overcrowding being a known factor in home accidents.

The two main factors

In all work in accident prevention, it is accepted that there are two factors which underlie all accidents; a human and an environmental factor. The human factor covers the physical state of the victim, conditions of disease or infirmity, which produce liability to accidents, for example, poor sight, impaired senses, stiffness due to rheumatism or arthritis, epilepsy, malignancy and diabetes. The psychological aspect of the human factor includes inexperience, carelessness, recklessness, absentmindedness in the elderly and the negligence of others, as well as of the victim.

The environmental factor includes dangers due to bad design and maintenance of the fabric of the house, faults in facilities provided for washing, cooking and heating, the choice and arrangement of the furniture, the design of, or misuse of, domestic equipment and appliances, and inadequate lighting. To this can be added nowadays the work of the ardent amateur with his or her 'Do it yourself' equipment.

PREVENTION OF HOME ACCIDENTS

Safety organization

In the Shaw Lecture on 'Industrial Accidents', given here in 1952, organizing for safety was described as being of three stages, the third of which had most certainly not yet been reached. The three stages suggested were something on these lines:

A survey of the raw problem followed by a general and elementary programme of publicity, education and tidying up.

The natural development of this programme into a planned course of action; proper safety training; increased influence of safety committees and a special service of propaganda, publicity and safety education.

The acceptance by *all* of the correct approach to all these problems, when the need for a special safety organization and safety officers will cease.

In short, a good safety organization works on the basis of making itself eventually redundant—a regrettably distant target.

The raw problem in home safety

In surveying the raw problem of home accidents many questions arise. Why do they happen? To whom do they happen? When do they happen? Where do they happen, and above all—need they happen? Most of the questions have been answered already. They happen through human ignorance or carelessness, through unappreciated dangers in the environment; they happen chiefly to the elderly and the very young; some parts of the house, notably the kitchen and staircase, are particularly dangerous; and they tend to happen at the 'rush periods' of the day. But can they be prevented? Results in other fields of accident prevention suggest that prevention of home accidents is, in fact, possible.

TABLE IV. REDUCTION IN FATAL ACCIDENTS 1954 COMPARED WITH 1935

<i>Fatalities</i>	<i>% Reduction</i>
On the roads	23%
On the railways	36%
In the factory	19%
Mining industry	54%
Drowning	37%

Before a really effective campaign can be instituted it is essential to obtain the fullest possible information regarding home accidents. Only full and readily available statistics can provide the essential background and point the various targets to be aimed at. Without them the safety worker cannot keep abreast of changing trends. While home accident fatality figures are obtainable, there is often considerable delay in publishing them—to-day, for instance, in the last month of 1956, figures for 1954 must be quoted since those for 1955 are not yet to hand! Equally great is the need, which has not yet been met, for accurate figures of non-fatal accidents, both local and national, so that those working in accident prevention can have as full and complete a picture as possible of the entire problem. Indeed, these figures are essential if the changing trends in the accident pattern are to be known and countered.

The three Es of accident prevention

These three Es are internationally accepted; Education, Engineering and Enforcement apply to accident prevention work in the home no less than on the road or in the factory. It is Ro.S.P.A.'s policy to undertake education in its

widest sense and to co-operate with, but leave to those better fitted to undertake them, the tasks of engineering and enforcement. Education includes both training and propaganda, using all the media available and for which funds can be found.

Engineering or scientific problems which are met with render technical advice essential; in this the willing and helpful co-operation of the Home Office is greatly valued, as well as that of the British Standards Institution, the Department of Scientific and Industrial Research, leading organizations dealing with gas, electricity and the use of solid fuel, the fire services, and many others.

Enforcement presents a more difficult problem. To date, home safety legislation has been limited to the Children and Young Persons (Amendment) Act 1952, and the Heating Appliances (Fireguards) Act 1953. Nevertheless, the Englishman's home is still his castle; the enforcement of preventive measures must imply some measure of inspection which would undoubtedly be unpopular and, in many cases, cause resentment and opposition—a very different position from that pertaining in industry with the Factories Acts.

THE HOME SAFETY CAMPAIGN

The need for measures to combat accidents in the home was first recognized by Ro.S.P.A. in December, 1931, when a conference of Women's organizations met and passed the following resolutions:

That it is desirable that women should take an active part in the prevention of all kinds of accidents, particularly those involving children and those occurring in home and everyday pursuits.

That the appropriate women's organizations and organizations for promoting the welfare of children be invited to co-operate by forming a joint committee in the form of a Women's 'Accident Prevention' Council with the object of investigating causes of home accidents and means of prevention, advising as to suitable propaganda, lecture notes, etc., encouraging women's organizations to include, where possible, accident prevention within the scope of their own activities and other similar measures.

Co-operation was the keynote from the start, and following this meeting some 52 organizations were approached and invited to appoint representatives of either sex to serve on this proposed council. The first meeting was in February, 1932. In this way the National Home Safety Committee of Ro.S.P.A. came into being, to be followed in the same year by the formation of local home safety committees in Leeds and Sheffield. Statistics were collected, thus pinpointing the major causes and chief victims of home accidents, and on these facts the propaganda measures of Ro.S.P.A. were based. From the start, a two-pronged drive against home accidents was initiated, one directed towards educating the public to realize dangers in the home, the other towards the improvement of environmental conditions and safe standards of domestic design. These activities, accompanied by the gradual increase in the number of local home safety committees, were carried on with increasing success from 1932 until the advent of the Second World War, when activities were temporarily curtailed.

Post-war progress

In 1941 Ro.S.P.A. began to turn its attention to post-war plans, and the means of obtaining funds to carry on an increasingly widespread home safety campaign. In 1948 the Home Office agreed to make Ro.S.P.A. a small grant-in-aid for a limited period to assist in the expansion of this work. As a result, Ro.S.P.A. set up a small department to deal specifically with home safety matters. This grant is, unfortunately, only of a temporary nature, but a basic fixed income as a firm foundation is essential if planning and expansion of the work is to proceed.

Since 1948 Ro.S.P.A.'s activities have continued to grow and there are now eighty local home safety committees affiliated to it, each carrying on the local campaign in their own areas. They receive as a quarterly service our Planning Guide and our Home Safety Bulletin, as well as annual statistics upon which to base their own local home safety campaigns. The Planning Guide contains sample educational and propaganda material, being an extension of the method so successfully adopted in our road safety work.

The National Home Safety Committee, to which the Home Office sends an observer, meets quarterly and deals with many matters pertaining to accident prevention. Information relating to environmental causes of accidents has led to the study of such factors as housing design, the safe use of gas, electricity and solid fuel, fireguard design, inflammable fabrics, the banning of unsafe toys and improvements in the design of children's cots, prams, chairs and harness.

The Press, both nationally and locally, has given valuable help, while many articles, or information for articles, are supplied every year to publications, varying from women's magazines and nursing and medical journals to tenant's handbooks. A very close and happy relationship has always existed between the safety movement and the B.B.C., and more recently Commercial Television; a number of sound and television programmes have been arranged from time to time. Despite this increasing interest and extension of knowledge on the subject of home accidents, however, the annual toll continues to be high and far more extensive work will have to be undertaken to reduce the high rate of home accidents both speedily and substantially.

The Home Office Standing Interdepartmental Committee

In 1947 the Home Office set up a Standing Interdepartmental Committee on Accidents in the Home, on which 13 Government Departments were represented. A representative of Ro.S.P.A. attends its meetings and so ensures a close *liaison*. Other departments not represented on the Committee are consulted when necessary. In 1953 the Committee published a most interesting and informative report on the subject of accidents in the home; the following very valuable comments come from the second paragraph of that report:

During the past five years the Committee has been able to gather together much information about the nature, extent and cost of home accidents which has not previously been available in a convenient form. This information has been of great value to the Committee, both in providing a general picture of the scope of the problem, and in focusing attention on particular hazards. It also

confirms the view which the Committee formed at an early stage of their work that the two most important causes of accidents in the home are faulty design and equipment and, in the broadest sense, human frailty; and that of the two, it is the human element—ignorance, carelessness and physical disability—that is the more important.

The position to-day

To-day the Home Safety movement has, to a reasonable degree, achieved that elementary programme of publicity, of education of professionally interested bodies, and of a general tidying up of effort which was referred to earlier in this paper. What is needed now is the second part of the programme; the study of the technical needs of the home; universal education in Home Safety as part of the training of the homemaker, and a rapid increase in the number of local Home Safety Committees able to render specialized service through continual local propaganda and publicity, and the study of local home accidents in relation to local conditions and patterns of living. In this way the practical work of promoting safety in some 14½ million homes can be carried on.

Technical

DEVELOPING THE HOME SAFETY PROGRAMME

The technical needs of the home in relation to safety include such diverse problems as improved design of houses, especially in relation to the housing of the ageing section of the community; more consideration being given to efficient working lay-outs in kitchens which will reduce fatigue and eliminate accident risks; and the guarantee of technical safety in all heating, cooking and washing appliances and, indeed, all forms of gas, oil, solid fuel and electrical equipment. Protection of the consumer against faulty goods and better standards of safety design in all forms of domestic equipment and utensils can, and must, be achieved and a careful study should be made of all new developments in household cleaning agents and synthetic fabrics to ensure that any dangerous properties can be recognized and controlled. These matters are the constant concern of Ro.S.P.A. and those other organizations represented on its National Home Safety Committee, namely, the Home Office Standing Interdepartmental Committee, the British Standards Institution, the Gas Council, the British Electrical Development Association and the Women's Advisory Council on Solid Fuel.

It is encouraging to note that some local authorities are paying attention to the need for special forms of housing accommodation for the ageing, and also the provision of fireguards and fixtures in their housing schemes.

Educational

The second need, of universal education in home safety as part of the training of the homemaker, is a vast and complex problem, but it is, in part, being carried on by district nurses and health visitors who have access to individual homes; through welfare centres and clinics, and by workers in the field of old people's welfare, both statutory and voluntary. It is encouraging, too, that voluntary organizations like the British Red Cross Society and the St. John Ambulance Brigade, include home safety training in their junior and adult courses.

Educational bodies, too, are realizing the need for, and opportunities of, including home safety training for young people in schools and colleges, largely through the domestic science, home craft and mothercraft classes, while many training college students have recently made accident prevention the subject of a thesis on various aspects of social studies. Parent-Teacher Associations are also showing concern for the home accident problem. This development augurs well for the coming generation of housewives and mothers, but there is so much need for continual and increasing development along these lines.

More local activities

In the Road Safety Campaign invaluable service has been rendered by Local Road Safety Committees, of which there are now at least 1,000; but the increase of Local Home Safety Committees has lagged behind largely from lack of funds. There is a great need in every area for a body of informed opinion to study the local home accident problem and to interpret the national campaign in effective local terms. Conditions vary immensely from one area to another. Ro.S.P.A. strives continually to provide the inspiration and incentive for local health authorities and local Home Safety Committees, but must inevitably rely on local effort to augment and carry on activities on their own home ground. It is only through a central organization undertaking the investigations and enquiries on a large scale, in co-operation with central Government bodies, and by using local authorities and interested organizations to apply these findings on a local level, that this campaign to reduce the terrible toll of human life and suffering can be carried on.

Existing Local Home Safety Committees now number eighty and that number is slowly but surely increasing; it would increase more rapidly with adequate financial and moral support. Great tribute must be paid to the work of these Committees, whose efforts reflect the enthusiasm and initiative of volunteers aware of the urgency of the problem and willing to give generously of their time and energy in this vital task. Many Committees began, and still do begin, by raising funds themselves to carry on their work until such time as the value of their work is recognized and a grant made from local authority sources.

Under existing legislation, the Medical Officer of Health has full powers to undertake this work under the National Health Service Act 1946, Section 28, and the Local Government Act 1948, Section 136. These Acts enable local Health Authorities, with the approval of the Minister, to contribute to any voluntary organization formed for the purpose of the prevention of illness within the area of that Authority. Each Local Committee finds its own most useful sphere of action, and is usually made up of the Medical Officer of Health, the Chief Constable, representatives of nursing and health visiting services, the Gas and Electricity Boards, the Fire Service, the local Education Authority, and members of many voluntary organizations. Activities are many and varied, and include the collection of local accident statistics, publicizing information in the Press, lecturing, arranging displays, exhibitions and film shows, distributing propaganda material, renting or providing fireguards and generally

promoting and expanding the work of home accident prevention in that locality.

CONCLUSION

1956 has seen two landmarks in our work of accident prevention in the home. The first has been the creation of an all-party Home Safety Group in the House of Commons, with Dr. D. McL. Johnson and Mr. Hilary Marquand as joint chairmen. This excellent move has been made possible by the work of two women M.P.s; one a Vice-President of the Society, namely, Mrs. Jean Mann, and the other Mrs. Patricia McLaughlin. This is indeed a splendid and helpful recognition of the value and, indeed, urgency of Home Safety work.

All will agree that the second landmark has been reached to-day. Accident prevention is indeed an art, an exceedingly difficult one too, particularly when it concerns our own homes. All who work for Home Safety, in particular Ro.S.P.A. and its hardworking and enthusiastic National Home Safety Committee, will join in saying thank you to the Royal Society of Arts for providing this opportunity and this platform and by so doing showing its official recognition of this particular field of Accident Prevention.

DISCUSSION

THE CHAIRMAN: I am sure you will all later wish to express your appreciation of General Young's very interesting, informative and, if I may say so, entertaining paper. I, and I am sure all of us in this audience, am delighted to see that we have here a large number of young ladies who will be the home makers of the next generation. I entirely agree with what the General said: we must interest the youngsters, we must educate them and if they take the lessons given here to heart, that alone will have made General Young's talk well worth while.

I was interested to hear what General Young had to say about the Press. He paid tribute to the assistance which he gets from the British Broadcasting Corporation and Television, and the Press generally. Of course, the Press were always willing to report an accident because that is news, but some newspapers go very much further. Where I live we recently had a Home Safety Week, and the week before last I was very interested to see a long article in the *Windsor, Slough and Eton Express* of Friday, 30th November, 1956, which gave a very full explanation of a really safe fireguard which has been designed. That is the sort of publicity we want and if we can get it every week in the local paper, then it is most helpful. Repeated publicity of this kind, with practical advice, that is the way we are going to make progress.

General Young commented on the numbers of accidents in the home as compared with the number on the road, but the comparison does raise a problem. Are methods which are being found appropriate for reducing road accidents or factory accidents also applicable to accidents in the home? That is a real problem and if the General will allow me to say so he drove the nail well and truly home when he referred to the fact that these accidents happen in the 'Englishman's castle'. He emphasized that not one of us wishes to see inspectors coming round to see what our safety devices are like, and whether the stair carpet has still got that hole on the tread. I am sure we will all agree with General Young that there would be strong opposition to any suggestion that inspectors should be appointed with powers to enter our homes to see what conditions were like from the angle of home safety. In the Home Office, in which I have the honour to serve, one of our main responsibilities is to protect the liberty of the individual. It is our task to draw attention to any proposals in legislation or bye-laws which might result in incursions.

Another point which I was impressed with in the General's speech was his reference to the problem of the aged. We know that efforts are being made to provide residential homes for old people, but we must never lose sight of the fact that there are large numbers of elderly people who will not go into a home and live with other people. They have got their little home in which they have lived for twenty, thirty, or forty years, and where the children grew up. To-day the children have gone away, but the old mother, the old father, simply will not give up the home. The result is that, despite all that we can do with education, propaganda and improved safety devices in the home, the more successful the medical profession is in helping us to live longer, the more serious is going to become the problem of the accidents to the aged. The older we get the more feeble we get. One of the real problems in home accident prevention is going to be that of coping with an increasingly aging population, many of whom will fight to the last ditch before they will go and live with other old people and sacrifice the household goods which they have had round them for many years.

SIR HAROLD SAUNDERS (a Member of Council of the Society): May I say, as a Member of Council of the Society, how glad we are to have a talk of this kind in this lecture hall and how pleasing the reference that General Young made in his paper appeared to me. We were founded just over 200 years ago for the encouragement of Arts, Manufactures and Commerce: one of the Arts which we regard in this Society as very important is the art of living.

In one of the lists in the paper it is shown that 61 per cent of the accidents occurred by reason of falls and the majority of those injured were 65 years of age and over. Can General Young give me any information as to what percentage of that 61 per cent is due to small mats on polished floors? I for one have known several cases of serious accidents to elderly people due to a mat slipping on a polished floor. In my own home the mats are fastened down. It seems to me also that the ordinary mat could be made safer by means of a rubber strip holding it to the floor.

THE LECTURER: I cannot give you figures because I have not brought figures with me. The fact does remain that the case you give of a slipping mat on a polished floor is a frequent cause of accidents; I do agree with your suggestion, we have done it in our own flat with two rugs and we did it before I joined Ro.S.P.A. We have put rubber strips at the corners to stop them from slipping. It can be done and that is a very sensible precaution to take, because so many of the accidents to the elderly are caused by falls of which this is one particular type. They do cause fractures, they do leave in many cases permanent disablement and the victims do require continuous help and assistance by nursing.

MRS. PHYLLIS LOVELL: I am Phyllis Lovell, of the magazine *Woman*, and also of the magazine *Mother*, in both of which I write direct to over 4 million women in the home, and in which I deal, among other things, with quite a lot of 'do-it-yourself'. I was concerned to hear that 'do-it-yourself' gadgets are responsible for accidents, and I would like to ask General Young if he could indicate any particular items, because I would naturally want to warn readers against harmful practices, and I would not want to include in my article suggestions for using tools which are known to be dangerous.

Could not the Royal Society for the Prevention of Accidents work in co-operation with the British Electrical Development Association, to agitate for legislation which would control the production of electrical equipment, and help to set standards which must be attained and maintained? As things stand at present, anyone can put on the market any electrical device, even a lethal one, without prosecution and without the fear of anyone being able to make him stop making it. This has in fact happened, and though the particular articles of which I have knowledge have been withdrawn, the same thing could still happen. B.E.D.A. have knowledge gained from the testing

laboratories; but the general public does not know what has been tested and what not. And even if B.E.D.A. should find a piece of equipment to be dangerous, they have no power to demand its withdrawal from the market. They can, in fact, do nothing but go to the manufacturer, suggest improvement, and try to coax him to take their advice.

Another legislative point about electricity is safety through standardization. I believe that in Canada no piece of electric equipment may be sold without its plug attached to it. There is obvious good sense in this law; and though I realize it could not be put into instant practice here, I do suggest that this is another field for co-operation between Ro.S.P.A. and B.E.D.A., with the intent of bringing about legislation on the matter of plugs and sockets. If we could have complete standardization of sizes we would not have the dangerous practices which are so common in many homes, where heavy-load equipment is used on a two-pin socket with no earth and, not infrequently, the plug-wiring actually fixed incorrectly.

Is there any analysis into income groups of the figures given in the paper? We do know from newspaper reports that there are parents who are ignorant of safety laws—and that among them there is a proportion who are not only ignorant and careless, but who actually do not care. The State compels such parents to send their children to school, under threat of prosecution. Surely there is at least an equal case to compel them to take those precautions which are, in fact, laid down by law to prevent accident by burning? The figures given in the table speak only of fatal accident. But we have other statistics on the great number of burns which are not fatal, but which may have caused maiming to small children and life disfigurement. We do know that the most elementary of all safety measures, the fireguard, is actually not to be found in many homes. And I suggest that, until we do have prosecution on this point, and the right of entry after an accident to ensure that the law is now being obeyed, and that any other children in the family will not suffer in the same way, this safeguard will continue to be neglected by those parents who really do not care.

THE LECTURER: The first point concerns 'do-it-yourself' gadgets. Those, please let me make this quite clear, are all types of hand tools and so forth, they are not by any means all electrical—some of them are, but they include for instance blow lamps, which have caused a great number of fires, and all that type of thing. Everyone thinks 'I can mend that, we won't call in the man, it will cost too much and it will take too long'. Also included under this heading are the various little tools, either man-power or electric-power tools, used in hobbies.

Now coming on to the composition of the Society's Home Safety Committee, I hoped that I had made it quite clear that we are in the closest possible touch with the electrical people. For many years Dame Caroline Haslett, who was formerly a Member of Council of the Royal Society of Arts, was our Chairman and she was for many years, until sickness overtook her, the Chairman of the Electrical Association for Women. B.E.D.A., which you referred to, is in fact represented on our Committee; their representative happens to be in here to-day, and so I think you are right off the line there, Madam, if you are suggesting that things are going on without our trying to get to the fountain head of electrical knowledge.

You then came on to the question of electric plugs. We must remember, and I hope that I shall not tread on any Canadian toes here, that Canada is a young country compared to this country, and this country has done all the pioneering and experimenting and developing of electricity in the house, with the result that there is every conceivable form of wiring and plug in every conceivable form of house. Canada, who came many years after it, had the advantage of all this experience. Before they had their big electrical schemes they were able to lay down the necessary laws and instructions as to what they could have, which is much easier, I could not

agree with you more. I have spent my life as a soldier moving from one house to another, never once have I moved (a) to the same voltage, (b) to the same plug.

The next point was the question of income groups. I can give you no factual statistical answer, I can only give you the impression that the majority of these accidents in the home are in fact in the lower income groups. I personally am quite sure you are wrong in suggesting the whip hand must be used. You say there should be a law that the mother who did not care much for its child and had allowed it to be burned because there was no guard, should be prosecuted. She can be now; she can be prosecuted to-day. Have you ever heard of one being prosecuted? The law is there, what more can be done? I think that law is a foolish one because it will not be implemented. You have to appeal through education. The same thing applies to all forms of accident prevention, different methods have to be tried of appealing to the individual's own frame of mind, his own set up, his own character. That is the way to do it, not by threatening punishment for non-compliance with rules. You do not get results that way.

MRS. LOVELL: Is there a link-up with the many women's organizations such as the W.V.S., the Rural Institutes, the Townswomen's Guilds, and so on, such as the giving of a perennial lecture by a member of Ro.S.P.A., to educate housewives in accident prevention? Because I feel there is here a ready-made and receptive audience, women who, though possibly ignorant, are certainly not of the 'don't care' type, and who would be anxious and grateful to be informed of hazards and their prevention.

THE LECTURER: There we can end on the happy note of complete agreement. We in London at headquarters, with our National Home Safety Committee, are in the closest touch with the London or national headquarters of those types of organization. They are, by and large, all of them represented on our National Home Safety Committee. On the local level we do urge local Home Safety Committees to get that type of individual to whom you are referring to be a member of the local committee to help them. Because what we want, and it bears out what you say, is to bring on to the committee people who can produce automatically an audience to whom one can go and talk. It is awfully exasperating having something to say and having no one to talk to! That is why I am so grateful to the Royal Society of Arts for helping to produce an audience to-day. But we do, believe me, all we can with all women's organizations and they do give us the greatest possible help.

MR. S. C. NORRINGTON: Would the lecturer explain the difference between the number of female deaths and the number of male deaths?

THE LECTURER: The shortest explanation is that there are more females born than males, but I am afraid that will not satisfy you. I think the chief answer is that the woman is, even now when the man puts on the apron and washes up, in the home more than the man, therefore the woman is the more exposed to an accident in the home.

MRS. M. BYRNE: I am the Chairman of the Women's Advisory Committee of the British Standards Institution. Arising out of what the last speaker but one said, I do feel that we should remind the audience that on that committee 24 women's organizations, including Ro.S.P.A., are most ably represented. We have a sub-committee which is a study panel and the various standards which are drafted by the Institution come to that panel for examination. We are not experts in all the various categories, but I think we could claim to be expert as women. We look through these draft standards with an eye for safety. It is quite surprising how often, when we are discussing something, for instance a hospital overall, someone on the committee will, for instance, give a warning that the buttons must not easily catch on this or that.

As well as being Chairman of that particular committee I earn my living in the

advertising profession, and I know the value of propaganda. I would like to stress how far-reaching are those appeals by the B.B.C. for fireguards. I am quite sure that they are half listened to. Last of all, I feel that you yourselves could appeal to the B.B.C. for such programmes as Gilbert Harding's 'on the spot' investigation programmes. The other day he was discussing this question of old age and the matter came up about the reluctance of old people to go and live in homes. While I do not think a lot can be done with those who are already in homes, I think that, speaking for myself and other middle-aged people, we can resolve to go into training for old age.

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MISS MARY LEIGH: I am the General Secretary for the Women's Advisory Council on Solid Fuel and a member of the Ro.S.P.A. Home Safety Committee. The chairman referred to a press cutting in a Windsor paper. By coincidence I found that paper on my desk this morning, and I think the notice in the last line says that a new fire-guard was designed according to the specification of the British Standards Institution. The Women's Advisory Council on Solid Fuel was represented on the Technical Sub-Committee. We were able to have five fireguards, made to that specification, sent to South Molton Street so that the British public and the press could see them. I do hope that anybody interested in home safety and the question of guards for a solid fuel fire might like to come along and see not only the guard but the crux of the whole matter, which is the fixing of the guard. It is well known that having a guard and having a guard fixed are two quite different things. We have nothing to sell, so I hope you will come and see. This guard can be seen at 18 South Molton Street, and nowhere else at the moment.

A vote of thanks to the Lecturer was carried with acclamation; and, another having been accorded to the Chairman, the meeting then ended.

G E N E R A L N O T E S

FURNITURE EXHIBITION, 1957

In this year's Furniture Exhibition at Earls Court two important innovations have been made. First, the exhibition has been divided into two separate sections, one for both public and trade on the ground floor and one for trade only on the floor above; secondly, a first-rate exhibition designer was appointed to design the public section.

The success of the first innovation cannot be assessed until the end of the show, though it does, after the first week, appear that the public, perhaps embittered by its experiences during occasional admissions to this exhibition in previous years, is not taking the fullest advantage of this year's opportunity.

From the moment of opening, however, there has been no shadow of doubt as to the success of the second experiment. Misha Black and his colleagues in the Design Research Unit have done a really splendid job. Earls Court—by no means a sympathetic setting for an exhibition—has never looked so gay and charming.

The central feature—a cascade of light falling on to a bed of spring flowers surrounded by stands of great elegance; the F symbol designed by Ronald Ingles and used to tremendous effect in the patchwork pattern of the high level murals; the crisp basic form of the Shell stands; the interesting colour everywhere; all these contribute to an exhibition which is a delight and which gives the public capital value for its half-crown. To the visitor coming in by the main Warwick Road entrance,

agree with you more. I have spent my life as a soldier moving from one house to another, never once have I moved (a) to the same voltage, (b) to the same plug.

The next point was the question of income groups. I can give you no factual statistical answer, I can only give you the impression that the majority of these accidents in the home are in fact in the lower income groups. I personally am quite sure you are wrong in suggesting the whip hand must be used. You say there should be a law that the mother who did not care much for its child and had allowed it to be burned because there was no guard, should be prosecuted. She can be now; she can be prosecuted to-day. Have you ever heard of one being prosecuted? The law is there, what more can be done? I think that law is a foolish one because it will not be implemented. You have to appeal through education. The same thing applies to all forms of accident prevention, different methods have to be tried of appealing to the individual's own frame of mind, his own set up, his own character. That is the way to do it, not by threatening punishment for non-compliance with rules. You do not get results that way.

MRS. LOVELL: Is there a link-up with the many women's organizations such as the W.V.S., the Rural Institutes, the Townswomen's Guilds, and so on, such as the giving of a perennial lecture by a member of Ro.S.P.A., to educate housewives in accident prevention? Because I feel there is here a ready-made and receptive audience, women who, though possibly ignorant, are certainly not of the 'don't care' type, and who would be anxious and grateful to be informed of hazards and their prevention.

THE LECTURER: There we can end on the happy note of complete agreement. We in London at headquarters, with our National Home Safety Committee, are in the closest touch with the London or national headquarters of those types of organization. They are, by and large, all of them represented on our National Home Safety Committee. On the local level we do urge local Home Safety Committees to get that type of individual to whom you are referring to be a member of the local committee to help them. Because what we want, and it bears out what you say, is to bring on to the committee people who can produce automatically an audience to whom one can go and talk. It is awfully exasperating having something to say and having no one to talk to! That is why I am so grateful to the Royal Society of Arts for helping to produce an audience to-day. But we do, believe me, all we can with all women's organizations and they do give us the greatest possible help.

MR. S. C. NORRINGTON: Would the lecturer explain the difference between the number of female deaths and the number of male deaths?

THE LECTURER: The shortest explanation is that there are more females born than males, but I am afraid that will not satisfy you. I think the chief answer is that the woman is, even now when the man puts on the apron and washes up, in the home more than the man, therefore the woman is the more exposed to an accident in the home.

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GENERAL NOTES

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the central feature seen along the wide central aisle is so positively attractive that he reaches it, and the many admirable exhibits immediately around it, with the impression that this is a very good exhibition of very good furniture.

Certainly the discipline of stands and layout softens the impact of the worst furniture—a welcome merit for, though the general standard of design and quality has improved most noticeably since last year, there is still plenty of the worst to be found in both the neo-reproduction and the 'corny' contemporary idioms. However, the worst *clichés* of the modernistic style—as, for instance, the canting of legs to the point of apparent failure which was for years its hallmark—are far less in evidence this year, and it is indeed encouraging that in the present exhibition most of the considerable improvement over last year's is to be found in the general run or second flight of so-called contemporary furniture which is moving from modernistic vulgarity towards something much more straightforward and of to-day.

A few years ago it would have been impossible to review this exhibition without specifically appreciating the small number of firms making furniture of the first flight in design and quality. To-day that invidious situation does not arise for, happily, there are too many—not only the old guard, but also newcomers and returned absentees. If I have a criticism of even the best furniture it is that, with one or two notable exceptions, its quality of polish is not good enough; that the finish is superficial and will begin to deteriorate immediately with use; that this furniture will not age with dignity as, for instance, some Danish furniture certainly does.

Two composite exhibits of great interest and importance must be mentioned; these jointly surround the central feature and are presented by the Council of Industrial Design and by the Society of Industrial Artists. The former has chosen from exhibits throughout the show the best designed and made examples of furniture and accessories, and so does honour to the present; the latter includes the work of students and young designers and so gives great promise for the future. Both exhibits are beautifully staged.

In conclusion, from every point of view there can be no question that this year's public section is by far the best Furniture Exhibition ever presented at Earls Court, nor can there be any doubt of the value to exhibitors of the public's direct reactions to their furniture. It is to be hoped that soon the two sections, public and trade, will amalgamate into one public exhibition designed as well as this year's public section and that the public, stimulated by its experience this year, will flock to it.

R. D. RUSSELL

IMPERIAL INSTITUTE

The first exhibition representative of the African and European art of the three constituent countries of the Federation of Rhodesia and Nyasaland will be held at the Imperial Institute from 7th to 24th February. The exhibition will be open from 10 a.m. to 4.30 p.m. on Mondays to Fridays, from 10 a.m. to 5 p.m. on Saturdays, and from 2.30 p.m. to 6 p.m. on Sundays.

RESEARCH AWARDS

The Leverhulme Trustees offer to British-born subjects normally resident in this country two scholarships of £600 for one year's advanced study at a centre of learning in any European country except Great Britain or Ireland. The scholarships are not intended for students of modern languages, but there is no other restriction of subject, although preference will be given to candidates wishing to study an Arts subject. Candidates should be aged between 26 and thirty on 1st September, 1957, and married scholars may be paid an additional allowance. Full particulars are obtainable from The Secretary, Leverhulme Research Awards, St. Bridget's House, Bridewell Place, London, E.C.4, to whom application forms should be returned by 28th February, 1957.

CORRESPONDENCE

HANDWRITING

From R. PIGGOTT, N.D.D., 10 FINLAY DRIVE, DENNISTOUN, GLASGOW, E.I.

I am conducting an extensive survey of handwriting, the results of which will later be published in the form of an analysis. For this purpose as many examples of every type of handwriting as can be accumulated will be required.

If I may presume upon the hospitality of your columns, I would appeal to all Fellows to send me a small example of their handwriting (three or four lines will suffice). It is not necessary to include sender's name and address, unless acknowledgment is required (in this way anonymity will be assured), but the following details should be noted along with the example: (1) age; sex; (2) profession; (3) type of nib—fine, medium, broad, oblique or ball point, and (4) whether the writer is right- or left-handed.

May I in advance thank Fellows for their co-operation and assure them at the same time that every single example will be of the utmost importance.

SHORT NOTES ON BOOKS

CONTÉ. By Cedric Daw. *Studio*, 1956. 18s

Conté, the richest of the black and white media, is explained in this book which is Number 64 in the Studio's 'How to do it' series. The author, a film-set designer, gives many examples, both visual and descriptive, of the versatility of the medium.

JAPANESE GARDENS. By Jiro Harada. *Studio*, 1956. 35s

Garden layout in Japan is closely linked with the national history and culture. In many cases identified with temples, the gardens express this connection in their landscaping, and the author of *Japanese Gardens* explains for western readers their history and significance. There are 200 illustrations representing 116 gardens.

FROM THE JOURNAL OF 1857

VOLUME V. 6th February, 1857

RAILWAY COLLISIONS

A letter from G. N. Shore, Lyme Regis, Dorset, 30th January, 1857.

Sir,—As there is so much loss of life, limb and property by railway collisions, allow me to suggest a telescopic or compressible truck, to be placed before, and another after, each train, the resisting medium being vulcanized India rubber, with ample space to expand externally and internally on being compressed, which would materially ease, if not wholly prevent any serious accident, at a comparatively trifling cost.

Some Activities of Other Societies and Organizations

MEETINGS

SAT. 2 FEB. Chemical Engineers, Institution of, at the Midlands Institute, Paradise Street, Birmingham. 2.30 p.m. E. J. Eaton and R. Parkins: *Automatic Control of Continuous Distillation Plant*. Horniman Museum, London Road, S.E.25. 3.30 p.m. Dr. K. Oakley: *Early Man's Use of Fire*. Interplanetary Society, British, at Caxton Hall, S.W.1. 6 p.m. Wing-Commander F. Latham: *Accelerations in Flight*.

MON. 4 FEB. Geographical Society, Royal, Kensington Gore, S.W.7. 5 p.m. Lieut.-Col. G. E. Wheeler: *Recent Developments in Soviet Central Asia*.

Imperial Institute, S.W.7. 5.45 p.m. Mrs. I. M. Spy: *The Man on the Spot—Canada*.

University College, Gower Street, W.C.1. 5 p.m. Dr. V. W. Crane, J. C. Miller and C. V. Doren: *Benjamin Franklin in Anglo-American Relations, 1763-83—the Boston Agent and the Point of Sovereignty*.

- TUES. 5 FEB.** Engineering Designers, Institution of, 38 Portland Place, W.1. 6.45 p.m. F. J. Watson: *The Design of Closed Cycle Air Engines, Part I.*
- WED. 6 FEB.** Engineers, Junior Institution of, at the James Watt Institute, Great Charles Street, Birmingham. 7 p.m. The Kitimat Scheme Film: *Man with a Thousand Hands.*
- Petroleum, Institute of, 26 Portland Place, W.1. 5.30 p.m. Dr. J. T. Tyson: *Patents in the Petroleum Industry.*
- Road Transport Engineers, Institute of, (1) At the Machanics Institute, Nottingham. 7.30 p.m. L. Manual: *Metal Spraying and Reclamation*; (2) At the Royal Hotel, Bristol. 7.30 p.m. A. Enticknap: *Gas Turbines and their Application to Road Transport.*
- University College, Senate House, Malet Street, W.C.1. 5.30 p.m. D. Cooper: *Cubist Painting.*
- Victoria and Albert Museum, S.W.7. 6.15 p.m. E. C. Murray: *Decorative Painting in England—II; Mid-Georgian to Regency.*
- THURS. 7 FEB.** Anthropological Institute, Royal, 21 Bedford Square, W.C.1. 5.30 p.m. M. Freedman: *Religion and Society in South-Eastern China.*
- Electrical Engineers, Institution of, Savoy Place, W.C.2. 5.30 p.m. Sir I. Evans: *The Place of Engineering in University Education.*
- Engineering Designers, Institution of, 38 Portland Place, W.1. 6.45 p.m. F. J. Watson: *The Design of Closed Cycle Air Engines, Part 2.*
- I.C.I. Merseyside Scientific Society, at the I.C.I. Widnes Laboratory, Lancs. 6.15 p.m. Dr. E. Lofthouse: *The Transuranic Elements.*
- Metallurgical Society, at the University, Leeds, 2. 7.15 p.m. Professor A. Prece: *Fuel Ash Corrosion Problems.*
- Metals, Institute of, 17 Belgrave Square, S.W.1. 6.30 p.m. B. Kjellgren: *Beryllium.*
- Radio Engineers, British Institution of, at the College of Technology, Sackville Street, Manchester, 1. 6.30 p.m. R. F. Farr: *Electronics in Medicine.*
- Refrigeration, Institute of, at 14 Rochester Row, S.W.1. 5.30 p.m. Dr. E. M. Barnes: *Antibiotics for the Preservation of Perishable Foods*; and Dr. R. S. Hannan: *A Discussion of the Possibilities of Using Ionizing Radiations for Preserving Foods.*
- FRI. 8 FEB.** Engineers, Junior Institution of, 14 Rochester Row, S.W.1. 7 p.m. R. J. Herbert: *Kinematic Design.*
- Industrial Artists, Society of, at the Engineering Centre, Stephenson Place, Birmingham, 2. 7.30 p.m. A. L. Thorogood: *Research and the Designer.*
- Mechanical Engineers, Institution of, 1 Birdcage Walk, S.W.1. 6 p.m. C. W. Griffiths: *The Economics of Plant Replacement and Renewal.*
- Royal Institution, 21 Albemarle Street, W.1. 9 p.m. Sir C. Gibb: *The Story of the Turbine, Steam and Gas.*
- SAT. 9 FEB.** Horniman Museum, London Road, S.E.23. 3.30 p.m. Dr. G. Vevera: *Animal Life in the Arctic.*
- MON. 11 FEB.** Engineers, Junior Institution of, at Livesey Clegg House, Sheffield. 7.30 p.m. S. S. Eilam: *Power Station Construction.*
- Imperial Institute, S.W.7. 5.45 p.m. M. A. Wellham: *The Man on the Spot—the Shores of Cyprus (under-water exploration, 1955).*
- Road Transport Engineers, Institute of, at 90 Deansgate, Manchester. 7.30 p.m. A. Enticknap: *Gas Turbines and their Application to Road Transport.*
- Transport, Institute of, at 60 Portland Place, W.1. 5.45 p.m. Lord Douglas of Kirtleside: *Comparative Economics of Pure Jet versus Turbo-prop Aircraft.*
- TUES. 12 FEB.** Chemical Engineering Group, 14 Belgrave Square, S.W.1. 5.30 p.m. D. E. B. Greensmith: *Some Aspects of British Standards in Relation to Chemical Engineering in the Chemical Industry.*
- Design and Industries Association, at the Gedfry Museum, Kingsland Road, E.3. 6.30 p.m. E. Barnsley: *Craftsmanship and Your Future.*
- Metals, Institute of, at the University College, Singleton Park, Swansea. 6.45 p.m. Professor J. G. Ball: *Neutron Irradiation Effects in Metal.*
- Photographic Society, Royal, 16 Princes Gate, S.W.7. 7 p.m. S. J. Coleman: *Quality in Photography.*
- Road Transport Engineers, Institute of, at the Engineering Centre, Stephenson Place, Birmingham. 7.30 p.m. G. Langford-Allen: *The Use of Plastics in Commercial Vehicle Bodies.*
- Textile Institute, at the Technical College, Bolton. 7.30 p.m. Dr. F. C. Toy: *Thoughts on the Future of the Lancashire Textile Industry.*
- WED. 13 FEB.** Archaeological Institute, Royal, at Burlington House, Piccadilly, W.1. 5 p.m. R. Sherlock: *English Brass Chandeliers and Their Makers.*
- Central Asian Society, Royal, at Burlington House, Piccadilly, W.1. 1.30 p.m. T. Preston: *Co-existence Impressions of Soviet Russia.*
- Engineering Inspection, Institution of, at the Royal Society of Arts, W.C.2. 6.45 p.m. B. R. Byrne: *Sampling Systems for Inspection and Quality Control.*
- Fuel, Institute of, at the Institution of Civil Engineers, Great George Street, S.W.1. 5.30 p.m. C. H. Bosanquet: *The Rise of a Hot Waste Gas Plume*; and A. C. Best: *Maximum Gas Concentration at Ground Level from Industrial Chimneys.*
- Health, Royal Society of, at Caxton Hall, S.W.1. 2.30 p.m. A. MacDonald: *Sanitary Installations and Appliances; their Place in good building Design.*
- Metallurgical Society, Manchester, at the Central Library, Manchester. 6.30 p.m. Dr. J. W. Rodgers: *Titanium.*
- Radio Engineers, British Institution of, (1) at the Technical College, Wulfruna Street, Wolverhampton. 7.15 p.m. K. M. McKee: *An Automatic System for Electronic Component Assembly*; (2) at Neville Hall, Westgate Road, Newcastle-upon-Tyne. 6 p.m. J. F. Meredith: *Servo-controlled Mechanism for Simulation of the Human Kidney.*
- Textile Institute, at Burlington House, Piccadilly, W.1. 7 p.m. J. S. Ingham: *New Textile Finishes.*
- University College, Senate House, Malet Street, W.C.1. 5.30 p.m. D. Cooper: *Cubist Painting.*
- Victoria and Albert Museum, S.W.7. 6.15 p.m. Sir Gavin de Beer: *The Origin of the Etruscans.*
- THURS. 14 FEB.** Chemical Society, at the Royal Institution, Albemarle Street, W.1. 7.30 p.m. Professor C. K. Ingold: *The Course of Polar Reactions in Non-Polar Conditions.*
- Kinematograph Society, British, at the Royal Society of Arts, W.C.2. 7.15 p.m. Professor J. D. McGee: *Photo-electronic Aids to Photography.*
- Metallurgical Society, Liverpool, at 9 The Temple, Dale Street, Liverpool. 7 p.m. Dr. A. H. Cottrell: *Work Hardening and Dislocation Theory.*
- Metals, Institute of, at the Engineering Centre, Stephenson Place, Birmingham. 6.30 p.m. Professor A. R. E. Singer: *Modern Developments in Forging, Rolling and Extrusion.*
- Radio Engineers, British Institution of, (1) at 1 Old Hall Street, Liverpool, 3. 7 p.m. E. W. Pulford: *Radioactivity and Methods of Measurement*; (2) at 39 Elmbank Crescent, Glasgow. 7 p.m. F. H. Tanner: *The Earth Satellite Project.*
- FRI. 15 FEB.** Engineers, Junior Institution of, 14 Rochester Row, S.W.1. 7 p.m. C. A. Wapling: *The Application of Pneumatic Controllers to Automatic Process Control.*
- Physical Society, at the Institute of Physics, S.W.1. 6.30 p.m. Dr. R. W. B. Stephens: *Acoustics in Non-destructive Testing.*
- Royal Institution, 21 Albemarle Street, W.1. 9 p.m. Dr. M. Mead: *The Study of Social Evolution.*
- Sound Recording Association, British, at the Royal Society of Arts, W.C.2. 7.15 p.m. F. Langford-Smith: *Some Recent Developments in Amplifiers.*
- SAT. 16 FEB.** Horniman Museum, London Road, S.E.23. 3.30 p.m. F. Cheng-Wu and Miss C. Chien-Ying: *The Technique of Chinese Painting.*

OTHER SOCIETIES

- NOW UNTIL 10 FEB.** Imperial Institute, S.W.7. Exhibition: *Children's Art from the Commonwealth.*
- NOW UNTIL 23 FEB.** Crafts Centre of Great Britain, 16-17 Hay Hill, W.1. Exhibition: *Silver and Engraved Glass, with Lithographs by the Sengfelder Club.*
- NOW UNTIL 24 FEB.** Science Museum, S.W.7. Special Exhibition: *500 Years of Pendulum Clocks.*